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ABSTRACT

Durham Technical Community College engaged in a strategic self-study which focused upon the development of an information and communication technology plan. A Steering Committee was appointed to oversee the self-study process and two principal committees--Instructional Technologies and Administrative Systems--and 12 study groups conducted the major work on the study. The study groups and principal committees collected information, identified needs for information and communication technology, compared alternative solutions, and recommended technology solutions for implementation. An introduction to Durham Technical Community College is provided in chapter 1, as well as an overview of the strategic planning process. Chapter 2 outlines the strengths of the College program. Chapters 3 and 4 are the reports from the principal committees, which summarize the study group reports. Chapter 5 presents the 5-year plan as approved by the Steering Committee and estimated costs of implementing the plan. Chapter 6 describes how the plan will be updated annually and how the technology initiatives will be implemented. Three major components of the plan were established in priority order: (1) a campus network; (2) instructional technology; and (3) administrative systems and applications. Appendices include the following: a list of the members of committees; survey results; inventory of hardware and software; hardware and software standards; a list of the members of the advisory committee; projects and estimated costs for years three through five; and information and technology project teams. (AEF)

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STRATEGIC PLAN FOR INFORMATION AND COMMUNICATION TECHNOLOGY

DURHAM TECHNICAL COMMUNITY COLLEGE

FEBRUARY 20, 1996

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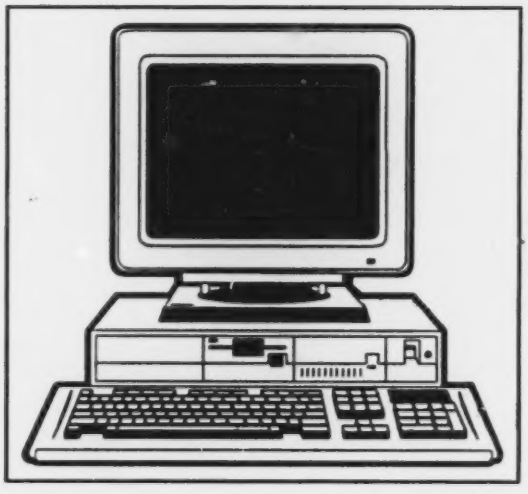

DURHAM TECHNICAL COMMUNITY COLLEGE

FEBRUARY 20, 1996

PREFACE

Under the leadership of President Phail Wynn, Jr., Durham Technical Community College has engaged its faculty, staff, Board of Trustees, and students in a strategic planning process as a part of its self-study for reaffirmation of accreditation. The focus of the strategic plan is information and communication technology required to prepare its students for the workplace and continued education in the 21st century. Although the plan addresses the information and communication needs for the next five years, the greatest benefit to the College has been the establishment of a broad-based strategic planning process which integrates planning, evaluation, budgeting, professional development, and resource development. The establishment of the Computing and Information Technology Planning Committee ensures continuation of the planning process, with an annual update of the plan.

Many individuals have participated in the development of the plan and the completion of the report. The Coordinating Team, consisting of Linda Green, Duane Dreyer, Barbara Baker, Bill Bilbrey, Jim Ragsdale, and I have spent many hours conferring, writing, and revising the reports, and these individuals deserve much of the credit for the final product. The Steering Committee played a key role in establishing the planning process and approving all aspects of the study. The Executive Council has supported the process and the outcome through approving policies and procedures and establishing funding priorities. The Information and Communication Technology Advisory Committee, with membership from area universities and businesses in the Research Triangle, has offered suggestions and helpful criticism at each successive iteration of the report. Finally, Michael Woodard, replaced by

Wanda Winslow, Jerry McDaniel, Bill Sewell, and MaryGrace Paul served as editors, carefully reviewing each draft of the report. Bill Sewell has assisted in writing Chapter 2 of the report and making major revisions of the document.

Only with the unfailing support and firm commitment from President Phail Wynn was it possible for the College to devote its time, energy, and resources to this study. His continued enthusiasm and encouragement throughout the process have been important in ensuring that the diligent work of so many individuals will have a lasting effect on the future of Durham Technical Community College.

To all who have participated but particularly to those who have committed so much time and creativity to this study, I express my appreciation. The process has proven that the College can effectively bring together its resources to effect change for the purpose of better addressing its mission of serving the people, as well as business and industry, of Durham and Orange Counties.

Brenda H. Rogers, Ph.D.

Director, Self-Study

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EXECUTIVE SUMMARY

INFORMATION AND COMMUNICATION TECHNOLOGY PLAN

Strategic Self-Study Process

Durham Technical Community College elected to engage in a strategic self-study which focused upon the development of an information and communication technology plan. The president appointed a Steering Committee to oversee the self-study process, chaired by Dr. Brenda Rogers, who was assisted by Linda Green, vice chair. Two principal committees--Instructional Technologies, with Duane Dreyer as chair and Bill Bilbrey as vice chair; and Administrative Systems, with Barbara Baker as chair and Jim Ragsdale as vice chair--and twelve study groups conducted the major work on the self-study. The study groups and principal committees collected information, identified needs for information and communication technology, compared alternative solutions, and recommended technology solutions for implementation. Chapters 3 and 4 of the strategic self-study report are the reports from the principal committees, which summarize the study group reports.

Chapter 5 presents the five-year plan as approved by the Steering Committee. Chapter 6 describes how the plan will be updated annually and how the technology initiatives will be implemented.

Major Components of the Plan

The Steering Committee established in priority order these three major components of the information and communication technology plan: (1) a campus network; (2) instructional technology; and (3) administrative systems and applications.

Campus Network. The campus network will provide the infrastructure to connect all buildings to computer resources. Faculty, staff, and students will have access to computer resources via the network. In 1995-96, fiber optic cabling will be installed in White Building, and selected work stations in White Building will be connected by copper to the fiber backbone. The network will provide access to the file server, housed in White Building, which will support e-mail and other applications. The first year will allow time to test the network in White Building as the Computer Services staff prepares for the installation of the entire network in 1996-97. In each of the buildings, spaces will be converted to wiring closets. Establishing the campus as an Internet node is also a 1995-96 project. The MCNC grant, funded by the National Science Foundation, will provide some financial support for the Internet project. The Internet router and T1 line have been installed, and the next step is to purchase an Internet file server. The College will be developing policies and procedures related to the Internet this year.

Instructional Technologies. The Instructional Technologies Planning Committee emphasized the use of multimedia for classroom instruction. Training selected faculty on multimedia development and applications will be a major initiative. The plan calls for establishing a multimedia development center which will provide the resources and support for faculty to learn this instructional technology. Since a faculty resource room is a part of the Technology Center to be completed in the next two years, a temporary location for faculty will have to be located and equipped. Upgrading existing computer labs and expanding open labs are addressed in the plan. Another first year initiative is the development of a distance learning plan. With the new Technology Center, the College will have an interactive

classroom designed for the delivery of instruction over the North Carolina Information Highway. The College has also applied for a license to offer instructional programming over wireless channels to Orange County and Chapel Hill-Carrboro schools as well as Northern Durham Center and other community colleges. Professional development is imperative to prepare faculty to deliver instruction over the Internet, the Information Highway, and one-way wireless channels.

Administrative Systems and Applications. One major goal of the plan has already been achieved through the implementation of a new telephone system. Improved communications with the public and within the College was a major need identified by many of the study groups. Voice mail boxes for faculty have given students a way to communicate with faculty at any time of the day or night and for faculty to retrieve their messages from off campus. The automated attendant has assisted in directing callers to the appropriate offices.

Another major project is upgrading the Prime administrative computing system. The College plans to convert to a UNIX platform for administrative computing in the next year. The new system will increase the number of users with connections to the administrative system. A second UNIX computer will provide for "read only" access to stored data and will also serve as a backup for the main administrative computer.

Expected Outcomes and Benefits to the College

The following are expected outcomes resulting from full implementation of the information and communcation technology plan:

1. Students who are better prepared for the workplace and other educational settings because of their demonstrated computer competencies.

2. Faculty and staff who are better prepared to use information technology for teaching and for performing their jobs.

3. Enhanced learning resulting from the effective use of information technology for instruction.

4. Improved and less costly services to students with disabilities.

5. Improved student and faculty access to learning resources through automation of the library and use of the Internet.

6. Better equipped laboratories and classrooms as computers are upgraded or replaced on a regular schedule and as repairs are completed on a more timely basis.

7. Alternatives to on-campus instruction through delivering courses over the Internet, the Information Highway, and/or ITFS channels.

8. Opportunities for students to supplement classroom instruction with instructional materials available over the campus network.

9. Improved career services for students who can conduct electronic job searches and submit applications and resumes to potential employers over the Internet.

10. Increased enrollment as the result of marketing the College's programs and services over the Internet, through increased use of distance learning and through improved services.

11. Improved registration process through the implementation of telephone registration.

12. Increased productivity of faculty and staff through the reduction of paperwork as information is transmitted electronically, with electronic mail (e-mail) replacing written memoranda, and through the use of applications software, such as word processing, spreadsheets, databases, graphics, and presentation packages, available over the campus network.

13. Improved communication between College personnel at all locations and between College personnel and the public through the use of voice mail, e-mail, and the electronic bulletin board.

14. Increased access to data and information stored on a file server and available to students, faculty, and staff over the campus network.

15. Improved academic advising as faculty access student records electronically for advising.

16. Efficiencies gained through standardizing on software and hardware.

CHAPTER 1: INTRODUCTION TO THE COLLEGE AND THE STRATEGIC PLANNING PROCESS

Durham Technical Community College Background

In the years following World War II, North Carolina began a rapid shift from an agricultural to an industrial economy. With that change came an awareness that a different kind of education was needed in the state. People not seeking a four-year education nevertheless needed more than a high school diploma.

In 1950, the State Superintendent of Public Instruction authorized a study of the need for a system of tax-supported community colleges. The resulting report by Dr. Allan S. Hurlburt, published in 1952, proposed a plan for developing state-supported community colleges. In 1957 the General Assembly also provided funding to initiate a statewide system of Industrial Education Centers. These centers were to train adults and selected high school students in skills needed by industry. By 1961 five public junior colleges emphasized arts and sciences, and seven industrial education centers focused on technical and vocational education.

The need to coordinate these two post-secondary educational systems led Governor Terry Sanford to appoint the Governor's Commission on Education Beyond the High School with Irving Carlyle as chair. In 1962 the commission recommended that the two systems be unified into one administrative organization under the State Board of Education and local boards of trustees. The resulting comprehensive community college system would provide technical and vocational education as well as two-year transfer postsecondary education.

In May 1963, the General Assembly, in line with the Carlyle Commission report, enacted into law G.S. 115A (later changed to 115D), which provided for the establishment of the North Carolina Department of Community Colleges under the State Board of Education which was to administer 20 industrial education centers, six community colleges (three of which became four year schools in 1963), and five extension units.

By 1966, the system had 43 institutions with an enrollment of 28,250 full-time equivalent (FTE). The system experienced rapid growth, with 54 institutions generating 59,329 FTE in 1969. The system exceeded a ten percent growth nearly every year until the late 1970's. System enrollments have continued to expand nearly every year but less dramatically over the last few years. The number of institutions has not increased since Brunswick Community College became the 58th system member in 1978.

In 1979, the General Assembly changed the state control of the system by establishing a separate State Board of Community Colleges. The Board was appointed in 1980, met several times with the State Board of Education, and assumed full authority on January 1, 1981. The Department of Community Colleges was separated from the Department of Instruction in all matters, including fiscal affairs, when the new State Board assumed control in January, 1981. The Board's first chairperson was Duke Power Company executive Carl Horn, succeeded in 1983 by John A. Forlines, president of the Bank of Granite; and William F. Simpson in 1989. In 1993, the current chair, Lt. Governor Dennis A. Wicker, was appointed.

In 1988, the North Carolina Community College System celebrated its 25th anniversary, recognizing that in its first quarter century of service, the system had emerged

as the nation's third largest community college system, serving millions of students and employing thousands of faculty and staff.

In November 1987, the State Board established the Commission on the Future of the North Carolina Community College System, a 23-member, blue-ribbon panel of business, civic and education leaders charged with establishing a system-wide agenda for policy and action over the next 25 years. The resulting 1989 Commission on the Future report outlined 33 recommendations which have been adopted by the State Board and the General Assembly. As a result, the Educational Blueprint has been developed as a strategic implementation plan.

The Department of Community Colleges has had five presidents: I.E. Ready (1963-1970), Ben E. Fountain, Jr. (1971-78), Larry J. Blake (1979-1982), Robert W. Scott (1983-1994), and Lloyd V. Hackley (1995-present). Charles R. Holloman served in an acting capacity from September, 1978 to July, 1979.

History of Durham Technical Community College. Durham Technical Community College is a charter member of the North Carolina Community College System. When the North Carolina General Assembly authorized a small appropriation to establish a limited number of area schools as industrial education centers in 1957, Durham already had a vigorous program in adult education through the Vocational and Adult Education Department of the Durham City Schools. A Practical Nursing program had been established in 1948; other programs included training in mechanical drafting, architectural drafting, and electronics technology. In addition, literacy skills training was offered for adults as well as courses to upgrade skills of workers in a variety of trades.

With the General Assembly's appropriation, the State Board of Education challenged various school administrative units in North Carolina to establish separate facilities to provide for the educational needs of the area's adult population. A comprehensive curriculum was developed for citizens needing education and the technical skills for advancing their careers.

Through action by the Durham City Board of Education, Durham was one of the first six counties in North Carolina to meet the State Board of Education's challenge. In a 1958 referendum, Durham County residents approved $500,000 to purchase a site and erect the first campus building, the Durham Industrial Education Center, which opened on September 5, 1961. The Center began with four programs, nine employees, and 34 students. On February 4, 1965, the State Board of Education designated the Center as a technical institute. On March 30, 1965, the local Board of Trustees authorized a name change to Durham Technical Institute. By 1965-66, the institution was offering ten curriculum programs with 21 full-time and three part-time instructors.

On July 15, 1986, the N.C. General Assembly approved Durham Technical Institute's request to add a College Transfer program, and on July 22, 1986, the Board of Trustees authorized a name change to Durham Technical Community College.

Accreditation. Durham Technical Community College is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools to award associate degrees. As a member of the American Association of Community Colleges, the College offers the following programs accredited by national associations: the Dental Laboratory Technology program, accredited by the Commission on Dental Accreditation of the American Dental Association; the Occupational Therapy Assistant program accredited by

the Accreditation Council for Occupational Therapy Education; the Opticianry program, accredited by the Commission on Opticianry Accreditation; the Respiratory Care Technician and Respiratory Care Technology programs, accredited by the Joint Review Committee for Respiratory Therapy Education and the American Medical Association; and the Pharmacy Technology program, accredited by the American Society of Health System Pharmacists.

Approbation. As a member of the North Carolina Department of Community Colleges, the College offers the following programs approved by state or national agencies: the Opticianry program, approved by the North Carolina State Board of Opticians; the Practical Nursing and Associate Degree Nursing programs, approved by the North Carolina Board of Nursing; the Phlebotomy program, approved by the National Accrediting Agency for Clinical Laboratory Sciences; real estate courses, approved by the North Carolina Real Estate Commission; insurance pre-licensing courses, approved by the North Carolina Department of Insurance; and the Basic Law Enforcement Training program, approved by the North Carolina Department of Justice.

Governance. North Carolina statutes provide for the organization and administration of a community college system under the direction of the State Board of Community Colleges. The 20 member board has full authority to adopt all policies, regulations, and standards necessary to operate the system. Members of the State Board are appointed by the Governor and General Assembly. The State Board has three major functions: equitable distribution of funds and fiscal accountability; the establishment and maintenance of state priorities; and educational program approval and accountability.

Locally, Durham Technical Community College is governed by a 12 member board of trustees with one ex-officio student member. Four members are appointed by the Governor, four by the Durham County Board of Commissioners, and four by the Durham Public Schools Board of Education. Trustees serve a four-year term and set the College's local policies.

The College's Board of Trustees has been chaired by five individuals: Robert L. Lyon, Edward L. Phillips, George W. Newton, James L. Nicholson, Jr., and its current chair, Jesse Anglin. The College has had three presidents: Harold K. Collins (1961 - 1975), John Crumpton (1975 - 1980), and Phail Wynn, Jr. (1980 - present).

Organization of the College. The president of the College is authorized to administer local policy approved by the Board, including the employment of all personnel and the responsibility for administrating operating funds. He delegates appropriate authority to his chief administrators, the Executive Council. This body consists of the following: Vice President/Executive Dean; Dean, Adult and Continuing Education; Dean, Institutional Research and Information Resources; Dean, Student Services; Director, Human Resources; Business Manager; Executive Assistant to the President/Director, Resource Development; and Assistant to the President/Affirmative Action Officer; and Director, Marketing and Communications.

Purpose. The Board of Trustees of Durham Technical Community College adopted the following statement of mission and purpose in January, 1993:

Within the scope and meaning of the North Carolina General Statute 115D, which creates and supports the College and the guidelines established by the North Carolina State

Board of Community Colleges, Durham Technical Community College conceives its purpose to be the development of an individual's maximum potential. Established to provide educational opportunities distinct from those offered through traditional academic education, the College also seeks to inspire an active desire for continuing personal development. Financially and geographically, Durham Tech provides an educational opportunity not otherwise available to area adults.

As a community-based institution, Durham Technical Community College provides educational opportunities for area citizens and uses local resources for students' learning activities. Community service is a continuing focus for the College's programs and activities.

Striving for maximum flexibility in course offerings, Durham Technical Community College employs an "open door with guided placement" policy to provide as many educational opportunities as possible for specialized training. Specifically, Durham Tech attempts to accept individuals where they are educationally and strives to provide them with opportunities to pursue educational programs leading to their career goals.

Mission.

The primary mission and purpose of Durham Technical Community College is to provide postsecondary technical and vocational education supported by the liberal arts, sciences, and basic skills courses to meet the educational and training needs of the residents, businesses, and industries in Durham and Orange Counties. More specifically, the College fulfills a comprehensive mission through pursuit of the following objectives:

to offer postsecondary occupational education which develops the skills and knowledge required for students' entry-level employment as qualified technicians and skilled craftspersons;

to offer technical and vocational programs designed to improve and upgrade the skills of workers currently employed which will enable them to meet the challenges of changing technology in the workplace;

to offer adults in the community numerous programs and courses which provide educational opportunities for basic skills improvement, high school completion, vocational advancement, and personal growth;

to offer a two-year course of study in the liberal arts and sciences which may be used as the first and second years of a baccalaureate program;

to offer training to serve the needs of new, expanding, and existing industry;

to offer instruction of the highest quality and to provide accessible, student-centered educational services within a supportive learning environment; and

to provide appropriate community service programs to promote cultural enrichment.

Goals. The Executive Council of Durham Technical Community College revised the College goals for the 1994-96 biennium on January 11, 1994, and the Board of Trustees approved the goals as a part of the 1994-96 Institutional Effectiveness Plan at its November 1994 meeting. The 1994-96 goals are as follow:

1. Ensure that residents in our service area have open-door access to programs and services that respond to their needs as well as the needs of the community at large.

2. Advance student learning through educational programs and services that ensure the achievement of student goals and student development.

3. Provide effective instruction that results in students achieving identified learning outcomes.

4. Provide comprehensive programs and services that prepare students for current and future workplace challenges.

5. Cultivate excellent faculty and staff through effective recruitment, retention, recognition, and professional development.

6. Support economic development by providing educational and training

programs in partnership with business, industry, government, and non-profit organizations.

7. Develop and maintain linkages with public schools, senior institutions, and other agencies that enhance opportunities for residents to continue their education.

8. Enhance programs and services through the use of advanced information technology.

9. Secure and manage responsibly the fiscal resources, human resources, and physical facilities necessary to support a positive learning environment for our students and to ensure accountability with other constituent groups.

10. Conduct on-going evaluation of programs and services to ensure continuous improvement in support of the institutional effectiveness program.

Educational Programs. The principal focus of Durham Technical Community College is the education of its students through technical, vocational, college transfer, adult and continuing education programs, and customized training for business and industry. The educational and training programs have been designed to meet the College's mission and goals and serve the needs of persons in the two-county service area of Durham and Orange Counties. The main campus is located in southeast Durham five minutes from downtown Durham and the Research Triangle Park. The Northern Durham Center and other convenient satellite centers serve residents of the two counties. Day, evening, and weekend programs provide flexible class schedules for a diverse student population.

The College is authorized by the North Carolina State Board of Community Colleges to award the Associate in Arts degree, the Associate in Science degree, the Associate in Applied Science degree, and the Associate in General Education degree, as well as diplomas and certificates. Courses are offered through 34 technical and vocational curriculum

programs, an associate degree in general education, and a two-year college transfer program for students seeking a four-year degree. Non-degree-seeking students may enroll in selected curriculum courses to enhance career opportunities, upgrade job skills, and train for new jobs.

The College provides educational opportunities for lifelong learning to adults through the Adult and Continuing Education Departments. Classes are offered at the main campus or at convenient sites in Durham and Orange Counties. The Adult Education programs include English as a Second Language, Adult Basic Education, Adult High School Diploma, High School Equivalency, and Compensatory Education. Continuing education courses are offered in occupational training, cultural enrichment, personal improvement, and general interest. Short courses, workshops, and seminars are held on the main campus and at community centers, recreation sites, public school buildings, churches, senior centers, public housing sites, and local businesses.

Student Profile. In the 1993-94 academic year, the College had an unduplicated enrollment in curriculum courses of 7,647 and in adult and continuing education courses of 12,679 for a total of 20,326 students served. The student body is 62 percent female and 38 percent male with a mean age of 30. The African American population is 37.5 percent, a proportion that exceeds the 30 percent African American population in the College's two-county service area. Annually the College serves approximately 4,000 adults in literacy programs of which 40 percent are African Americans, 11 percent are Hispanic Americans, 14 percent are Asian American, and .5 percent are Native Americans. The literacy target population is 37,648.

Approximately 60 percent of the students in curriculum courses are seeking a degree with the remainder taking one or more courses for personal interest, self-improvement, or career advancement. Fall quarter 1994 statistics showed the following: 57 percent of the student body was employed full-time and 25 percent, part-time; 70 percent attended part-time, with the mean credit hours taken being nine; 54 percent attended classes on the main campus or at the Northern Durham Center during the day, and the remaining 46 percent attended evenings or weekends on the main campus or at satellite centers.

Overview of the Strategic Planning Process

In 1993 Durham Technical Community College was one of six community colleges in the 11 state region approved by the Commission on Colleges of the Southern Association of Colleges and Schools (SACS) to participate in a pilot program. The College was authorized to conduct a strategic self-study that focused its time and resources on a critical campus-wide issue. Under the alternate self-study, the College reviewed and documented compliance with the Criteria for Accreditation in a less exhaustive manner, devoting its major time and efforts to the development of a five-year information technology and communications plan. A carefully formulated technology plan is essential for the College to maximize its resources and its impact in a technology-oriented service region. The College's proximity to the Research Triangle Park with leading industries like IBM, Nortel, Glaxo, and others means that its students must receive the most current technology training to be prepared for jobs in these industries. Furthermore, these companies turn to Durham Tech to provide occupational training to update the skills of current employees.

Development of the technology plan has resulted in strategies for sharing current

resources and managing the acquisition of new resources. The plan encompasses every aspect of information technology: technology-based instruction and multimedia, a campus-wide network, electronic and voice mail; easy access to valuable information stored in databases, library automation, staffing for computer support, training, hardware and software standards, and associated facilities planning.

During the development of the technology plan, the College conducted an extensive needs analysis. Based on the needs analysis, the College established prioritized goals and objectives and developed the process for accomplishing them. Since planning is a dynamic process, the information technology and communications plan incorporates a process for continual planning, implementation, and evaluation leading to regular updates to the College's plan. Administrative responsibility for the plan was assigned, and a time table and budget for implementation established. Durham Tech will use State and local funding to implement components of the plan but will seek additional public and private funding sources necessary for full implementation.

Selection of Self-Study Participants. In 1993, in anticipating the self-study and seeking ways to strengthen the College's planning and evaluation efforts, Dr. Phail Wynn Jr., President of Durham Technical Community College, hired Dr. Brenda Rogers as Director of Institutional Research and Information Resources. Dr. Rogers was appointed to serve as director of the self-study as well as chair of the Steering Committee and chair of the Institutional Effectiveness Committee. The appointments were based on her strengths in leadership, writing, planning and evaluation, and her ability to manage all aspects of the self-study process and the production of the final report.

Dr. Wynn and members of the Executive Committee met on several occasions in the late fall of 1993 to identify the other participants for the process. The vice chair of the Steering Committee and the chairs and vice chairs of the principal committees were selected to bring specific knowledge and skills to the self-study. They represent diverse experiences and all have the respect of their peers, a proven history of positive contributions to the College, and an institution-wide perspective.

Steering Committee and principal committee members were selected by Dr. Wynn and the Executive Committee to ensure broad representation from different areas of the College, as well as the needed blend of skills and strengths. Consideration was given to each individual's current job responsibilities, educational background, experience and length of time at the College. An attempt was made to produce groups which were broadly representative while at the same time allowing the College to avail itself of identified organizational and technical expertise.

Organization and Process of the Self-Study. President Phail Wynn first convened the Self-Study Steering Committee on January 13, 1994, and assigned the group the primary responsibility for all aspects of the reaccreditation self-study. During the next three months, the committee developed goals for the strategic plan, assigned responsibilities for components of the study, and developed policies and procedures. In April, the Self-Study Manual was completed and distributed to all participants. Once the manual was published, the Steering Committee met monthly to make necessary decisions and evaluate reports from the principal committees. The committee assured preparation and publication of the two self-study reports (the Compliance report and the strategic self-study report) and assisted in the arrangements

for the Southern Association of Colleges and Schools (SACS) visiting teams. (See Appendix A for membership of all committees and study groups.)

The Institutional Effectiveness Committee was a standing committee appointed in 1992 with responsibility for environmental scanning, development of planning assumptions to guide the 1994-96 biennial plan, identification of critical success factors and indicators to measure institutional effectiveness, and monitoring implementation of the institutional effectiveness plan. Chaired by Dr. Brenda Rogers, Director of the Self-Study, and with broad representation, the committee was selected to oversee and document compliance with the Criteria.

The Instructional Technologies Planning Committee and the Administrative Systems Planning Committee were convened in April, 1994. The instructional committee has representatives from all academic departments, the academic support staff, Educational Resources, Adult and Continuing Education, the Northern Durham Center, and Computer Services. The committee gathered information from all instructional units to augment the development of the five-year plan for using technology to enhance instruction. The plan included goals, objectives, priorities, and budget projections as well as documented training needs for faculty.

The Administrative Systems Planning Committee is represented by staff from the administration, student support, Adult and Continuing Education, financial and facilities services, and faculty. The committee studied the projected changes in existing administrative applications and the need for adequate computer equipment for the next five years. It identified automated applications to replace manual or out-dated operations and new

equipment specifications for administrative applications; documented the need and specifications for a campus network; designed new and expanded initiatives in areas such as graphics, electronic mail, and bulletin boards; and recommended a replacement for the current telephone system.

Early in the self-study process, a four-member Editorial Committee was formed. The chair served as a non-voting ex-officio member of the Steering Committee. Each of the other members was assigned to one of the principal committees. The Editorial Committee established and published editing guidelines and assisted in the preparation of all communications, including a quarterly newsletter Network, from the Steering Committee to the College community. The members edited and assisted in the production of the preliminary and final reports.

The Coordinating Team was established soon after the Steering Committee was convened. This small group, made up of the chairs and vice chairs of the Steering Committee and the two principal committees, facilitated the work of the Steering Committee and strengthened communication among the self-study groups. The team met weekly to resolve problems, draft material for the Steering Committee, ensure that all efforts were on schedule, and plan future activities.

In May, 1994, the Steering Committee distributed several surveys on campus to collect baseline data on needs for technology. Topics covered included the number of faculty and staff using computers for their work, the type of applications in use, factors preventing further use of computers, and student opinions of current campus technology. The Instructional Computing Survey was distributed to 102 full-time instructors and 87 part-time

instructors. Seventy-three percent of the full-time and 51 percent of the part-time instructors responded. The Administrative/Staff Computing Survey, distributed to 92 full-time and 32 part-time employees, had a response rate from full-time staff of 59 percent and 50 percent from part-time staff. The Student Survey of Campus Computing, distributed to 860 students, elicited 571 responses, or 66 percent. (See Appendix B for survey results.) In addition, a comprehensive inventory of hardware and software was completed. (See Appendix C.) In June 1994 the Steering Committee appointed a hardware and software standards committee charged with the task of establishing standards for new acquisitions and for campus support of software (Appendix D).

During the summer of 1994 the president established the Information and Communication Technology Advisory Committee consisting of technology experts from business, industry, and universities in the College's service region. Committee members donated their time and expertise to assist in the development and review of the five-year plan. (See Appendix E.)

Twelve study groups with four to eight members each were proposed by the Coordinating Team and approved by the Steering Committee. Each group was assigned to a principal committee and chaired by a member of that committee or co-chaired by one member from the Instructional Technologies Planning Committee and one from the Administrative Systems Planning Committee. From June to October of 1994, study groups investigated and documented the problems and needs of their assigned area. To supplement the results from the campus surveys, the groups conducted interviews, met with focus groups, and analyzed short surveys. Also to gather information, group members visited other

organizations, consulted with advisory committee members, analyzed literature, consulted with vendors, and attended technology workshops and seminars. From November 1994 through February 1995, the study groups formulated solutions to the problems. Study group findings were then incorporated into the appropriate principal committee's report.

The Information and Communication Technology Advisory Committee reviewed the study group reports and provided feedback to the Coordinating Team at meetings in November 1994 and March 1995. In addition to these formal sessions, there were many individual consultations between advisory committee members and study group members. Several advisory committee members had employees from their companies with expertise in specific areas review the corresponding report sections or meet with the study group to provide guidance. Input from advisory committee members was invaluable in guiding the development of the plan to keep it relevant and maximize its potential.

In April and May 1995, the principal committees' chairs and vice chairs summarized the information from their study groups and wrote the two committee reports. The reports were reviewed and accepted by the committee members. In June, Coordinating Team members consolidated the information from the two reports into a draft of the five-year plan. The advisory committee reviewed the draft in June and with input from that meeting the Steering Committee modified the draft during an all day work session. Next the Coordinating Team members revised selected components of the report and submitted it to the Steering Committee for a second review in early July. The final draft was completed and distributed to the campus for review in the fall. After two open hearings, the Steering Committee made final changes and adopted the report in November 1995.

Communication with the faculty, staff, and students regarding the purpose and activities of the self-study was a priority. Virtually every member of the faculty and staff at the College was involved in the self-study effort either by serving on a committee or study group or by providing information during the study process. Articles appeared in Signature, the student newspaper, and in Update, a quarterly employee newsletter. Each month from August 1994 through March 1995 a one-page calendar announcing self-study activities was distributed across campus. In September, 1994 the Editorial Committee, with the help of the Coordinating Team, published the first edition of Network, a quarterly newsletter devoted to self-study information for the faculty, staff, and advisory committee. The director of the self-study provided a quarterly update to the College's Board of Trustees.

During the self-study process, technology training has been a top priority. Training began in the spring of 1994 and has continued throughout the study. Numerous short workshops and seminars have been held on campus to present topics such as concepts of telecommunications, multimedia applications, concepts of networking, use of specific software packages, and the use of the North Carolina Information Highway. A technology fair was held for all employees in August 1994 and due to its success, it will become an annual event. The College recognizes that for technology to be effective, it must be accepted and used by the faculty and staff. For faculty and staff to become proficient in the use of emerging technology, training is a major component of the technology plan.

In January 1995 President Wynn initiated the Innovations in Technology Small Equipment Grant Program as a step in implementing the technology plan. The grants fund equipment for demonstration projects so that programs or departments can test innovative

ideas on a small scale. Projects must be capable of being replicated or shared across the campus. The projects must support the goals of the technology plan in enhancing instructional or administrative processes. In March 1995 two projects were funded. The first will provide a portable multimedia station to be used by faculty to develop multimedia applications for use in health technology classes. The second project is a prototype campus network for the Computer Services staff to begin learning to use the equipment selected for the campus-wide network and to test selected software. In May two additional grants were awarded. One will provide the network hubs and cards needed to establish a local area network within the Adult and Continuing Education Center. The network will incorporate office PC's, as well as the computer lab and classrooms, and will provide all users with access to the windows-based software on the lab server. The second grant will establish a campus video bulletin board to provide information on campus activities such as registration times and locations, meetings, and student activities.

In 1995-1996 the College community reviewed the strategic plan for information and communication technology. With Steering Committee approval, the plan establishes the priorities for technology-related investments over the next five years. Although annual revisions will alter some proposed projects, the plan will provide the general direction for information and communication technology. With an ongoing planning process in place, the College will be prepared to address the ever-changing demands for technology in the classroom and the workplace.

CHAPTER 2: STRENGTHS OF THE COLLEGE

During the past decade, Durham Technical Community College has made significant progress in strengthening its academic programs and overall institutional management. Among its most notable efforts have been (1) strategies to maintain a full- and part-time faculty with credentials to meet SACS criteria; (2) procedures for methodical curriculum development, updating, and evaluation; (3) a new student placement testing program (ASSET) complemented by an innovative developmental studies program; (4) a dynamic process for strategic and long-range institutional planning; (5) an institutional effectiveness program to measure the College's performance locally as well as state-wide; (6) establishment of the Durham Technical Community College Foundation with a continuing successful fund-raising record; (7) creative expansion of facilities; (8) continuously improved public relations with the College's service region; and (9) proactive measures to remedy long-identified deficiencies. The following narrative will describe such strengths.

Within the previous decade, the College has refined its recruiting procedures for acquiring both full- and part-time faculty and is continuing to develop more consistent methods for selecting the large number of part-time faculty on which it so heavily relies. Situated in the greater Triangle area with four major universities--Duke University, North Carolina Central University, the University of North Carolina-Chapel Hill, and North Carolina State University--the College has an outstanding applicant pool from which to recruit its highly qualified faculty to teach at the associate degree level. Furthermore, the College has made significant progress in documenting the credentials and other records of such a large and diverse part-time faculty. As the selection process has improved, the quality of instruction

has improved, as documented by student evaluations, classroom observations, and formal program reviews.

The College's program review model adopted in 1990, which evaluates not only the quality of instruction but also instructional support and other services, is unquestionably one of the College's strengths. Designed to be applicable to all programs and services of the College, the process emphasizes program and student outcomes, employer satisfaction, and community impact and provides the structure within which many of the College's previously uncoordinated assessment activities contribute to an integrated view of institutional effectiveness. Results of the program review are the basis for recommendations for improving instruction and support services. Since initiating the model, the College has met the mandate of the N. C. Department of Community Colleges by conducting a formal review of each curriculum program and developing a plan for updating each review on a five-year schedule.

The College's successful program review model, focused on curriculum improvement, underscores its state-wide reputation as an innovator in competency-based education (CBE). The model has creatively addressed curriculum development, evaluation and revision. Student surveys, course evaluations, employer surveys, and input from each program's external advisory committee are used as key sources of assessment of the curriculum, instruction, and support services. The process is further enhanced by consistent and regular reliance on program advisory committees which provide field expertise for developing and/or updating curricula. Although a formal program review may be conducted only every five years, curriculum evaluation and revisions occur more frequently based on input from the program advisory committees.

Another strength for the College during the past decade has been the refinement of a student testing process aligned with a strong Developmental Studies Program in reading, writing, and mathematics. The program has been successful in preparing students with minimal basic skills for enrolling in the College's technical and college transfer curricula. The program is a result of efforts of faculty and staff, begun in 1986, to research successful programs and develop a tier of courses aligned with a placement testing instrument. In the summer of 1994, the College adopted the ASSET, which thus far has proved to be a good assessment tool of students' basic skills.

To complement assessment and instruction in basic skills, the College further established in 1993 the comprehensive Campus Learning Center to expand, integrate, and enhance existing academic support services for students, including orientation, academic advising, tutoring, testing, and individualized learning. Evaluative instruments thus far reflect a highly positive impact of these measures on student success.

The College's institutional planning and evaluation process, as it has evolved over the last decade, has proved to be another strength due to its long-range impact on academic programs and institutional management. In 1986 the College implemented a two-year planning and evaluation cycle, which allows for the integration of the goals and objectives of the College's action plans with the employee Performance Review and Evaluation (PR&E) system. College-wide, the PR&E enables the employee and supervisor to establish performance objectives for the upcoming year, a mid-year assessment of these objectives, and a final performance evaluation. For faculty members, the evaluation includes results of a student evaluation of the instructor which, along with class observations, helps the academic

supervisor assess instructional quality and recognize outstanding teaching as well as identify weaknesses and means for improving. For any employee, the final evaluation may include a development plan to remedy deficiencies. The PR&E component of planning and evaluation recognizes individual accomplishments as well as deficiencies which must be addressed with a development plan for the subsequent year. When used consistently, this faculty evaluation strategy has proved to be a major institutional strength.

A broader institutional strength affecting all employees is the College's comprehensive planning process, reflected in the two-year Institutional Effectiveness Plan. The plan includes each department's objectives and strategies for achieving those objectives over the two-year period. Updated annually, the plan is designed to enable administrators to use planning outlines, planning assumptions, budget requests, and evaluation of the previous plan to prepare a new biennial action plan to include objectives for carrying out the College's mission and goals.

A major strength evolving from the College's comprehensive planning process is the identification by the standing Institutional Effectiveness Committee of five critical success factors directly linked to the College's ten goals which the College will address to maintain organizational viability. The 1995 Critical Success Factors: Measures of Institutional Effectiveness is thus far the strongest step toward summarizing data to assess effectiveness in achieving the College's mission. This document identifies strengths and weaknesses through outcome measures relevant to the College's mission and will evolve to reflect changes in goals and the critical success factors. Each factor has multiple, measurable indicators

demonstrating the College's performance in that area. Also feasible comparisons are made with the N.C. Community College System to provide a state-wide context for evaluation.

Another major strength is the success of the Durham Technical Community College Foundation, Inc., which, as a relatively new college foundation, has provided in the last decade significant revenue for providing students, faculty and staff educational and professional opportunities which would not otherwise have been affordable. For at least the past four years, the Foundation has exceeded its Annual Fund goal and has awarded grants to faculty and staff for innovative projects, awarded tuition grants to students across programs, supported special student programs and cultural events, and purchased equipment for special projects. As stated in its mission, the Foundation continues to be "a major catalyst for maximizing economic and human development in Durham and Orange Counties by cultivating and generating resources for the College and by educating the public on the benefits of investing in their community college."

Physical facilities have proved to be a significant strength during the past decade. In 1987 the Educational Resources Center was opened, with 9,447 square feet for book stacks, study tables and carrels, and research equipment for users. In 1988 the new Adult and Continuing Education Center was opened, and it currently has one of the campus's most up-to-date computer lab equipped for training hundreds of people from business and industry. A major development occurred in fall 1993 with the opening of the Northern Durham Center, with two buildings consisting of 30,000 square feet including spacious and well-equipped classrooms, along with a satellite dish for future distance learning. The Center is attracting an important new clientele from the northern part of Durham County including adjacent

Treyburn Industrial Center. The Center's two computer labs with modern equipment and software are major instructional sites for providing educational services for a rapidly growing professional audience needing new and expanding training in the emerging technologies. In 1994, the College purchased property on Lawson Street across from the main campus to renovate as a classroom building. To be completed in the fall of 1996, the Basic Skills Center will provide instructional classrooms for all Adult Education programs. With the state bond money approved in a general referendum in 1994, the College will construct the Technology Center on Cooper Street, next to the Newton building. The Technology Center will have a distance learning classroom, a multimedia teaching center, an open computer laboratory, and a health technologies computer laboratory. The Technology Center is scheduled for completion fall of 1997. A campus master plan addresses the need for renovating White and Collins buildings once programs are moved to the new facilities and presents a vision for linking the Lawson and Cooper Street facilities into a unified campus.

A strength that undergirds the College's progress during the last decade has been the unwavering commitment of Durham Tech's current president to the community college philosophy and, in particular, to promoting the benefits of that philosophy to the College's service region. As a strong civic leader and educator, the president has effectively articulated the College's mission to a constituency seeking high quality but affordable education and training. As one example of such visionary leadership for the College's information and communication technology plan, the president engaged experts from business and industry to serve on an advisory committee to recommend strategies for implementing the College's five-year plan for improving institutional management and academic programs.

The president's ability to manage limited institutional resources despite dwindling revenues has proved to be another strength for the College. He has taken strong initiatives for better institutional management through a redeployment of human resources to ensure a more balanced educational program and more efficient administrative support services, such as reassigning administrators new or different duties to advance the College's mission to decrease operating costs and redefining some administrative positions for more efficient management of human resources. He recently appointed a vice-president/executive dean to manage all instruction to ensure that all faculty expertise is appropriately assigned to meet the comprehensive instructional needs of the College.

Finally, a major strength of the College is the proactive stance it has taken in recent years to remedy a major deficiency due to lack of new technology for improving academic and administrative functions. Following are examples of such initiatives:

1. Acted on recommendations from program advisory committees for implementing new instructional technologies in selected courses.

2 Conducted on-campus technology fairs and workshops to increase faculty awareness of new technologies.

3. Awarded grants of up to $10,000 to faculty and staff to fund innovative projects which can be shared across programs.

4. Established the Campus Learning Center to provide comprehensive academic support to students and improve retention.

5. Increased computer-assisted instruction throughout the curricula, including mathematics and English courses.

6. Replaced computer labs with up-to-date equipment and software.

CHAPTER 3: REPORT FROM THE INSTRUCTIONAL TECHNOLOGIES PLANNING COMMITTEE

Purposes and Objectives of the Study

The Instructional Technologies Planning Committee was established by the Self-Study Steering Committee and charged with the goal to implement the planning, organizing, staffing, directing, evaluating, and upgrading of technology in the instructional environment. In February 1994, to provide additional direction, the Steering Committee developed and adopted the following objectives:

1. To inventory hardware, software, infrastructure, and faculty expertise currently available for instructional activities.

2. To develop an informational program for faculty who want to learn about information technology in the learning process.

3. To survey faculty requests for instructional technology.

4. To determine desired outcomes of using information technology in the educational process.

5. To synthesize a strategy and establish priorities for improving the instructional procedures of the College using information technology.

6. To implement the strategy within specific areas such as:

   -provide faculty training in information technology.
   -insure that every faculty member has access to information technology.
   -implement, in the classroom, information technologies including multimedia, distance learning, CD-ROM and laser disk.
   -establish an "open" computer learning laboratory which provides access to and from other institutional sites.
   -provide scanning technology for routine reporting functions such as grades and attendance.
   -insure access of disabled students to information technology.

7. To collaborate with the Administrative Systems Principal Committee on information technology matters of mutual concern, including e-mail, access to student records, access to external data bases, and access to the North Carolina Information Highway.

8. To plan for direct connection of faculty to administrative systems for direct access and input related to advising and grades.

Methodology

Five study groups, recommended by the Coordinating Team and approved by the Steering Committee, were assigned to the Instructional Technologies Planning Committee. A study group was assigned to investigate the need for information technology in each of the following areas: classroom technologies, computer laboratories, learning resources support, managing instructional processes, and technology training. Each group reviewed its charge, set specific objectives, reviewed the results of faculty and staff surveys, planned its methods of investigation, and reviewed the results of the Instructional Computing Survey, Administrative/Staff Computing Survey, and Student Survey of Campus Computing. Information gathered by the study groups contributed to the final report.

Classroom Technologies. The Classroom Technologies Study Group investigated strategies for using technology in the classroom, with an emphasis on multimedia presentations. The study group used the following data collection methods:

1. Group members visited other community colleges to observe use of classroom technology.

2. The group visited the Institute for Academic Technology (IAT) and met with a representative from IAT on campus for a consultation.

3. Group members interviewed faculty and staff to determine their awareness and interest in using technology in the classroom.

4. The study group held a technology fair on campus to demonstrate potential uses of multimedia by the faculty and staff, and members observed and questioned the participants during the fair.

Computer Labs. The Computer Labs Study Group investigated the use of open computer labs on campus and developed plans for greater student access to computers. The group used the following data collection methods:

1. Members reviewed the results and comments from the Student Survey of Campus Computing to assess students' satisfaction with existing computer labs.

2. Members interviewed College program directors to assess student needs in each area.

3. Members collected data on current computer lab use, hours of operation, number of computers in each lab, and available software.

4. Members visited an open computer lab at Fayetteville Technical Community College, and one member visited a lab at Catawba Valley Community College.

Learning Resources Support. The Learning Resources Support Study Group investigated the College's needs for materials and technology which should be met by the library and the Educational Resources Department. The study group used the following data collection methods:

1. Individual group members were assigned to attend department meetings throughout the College to explain the group's charge, assess faculty needs, and enlist faculty participation in establishing priorities for learning resources technology.
2. Members interviewed each of the College's program directors to elicit additional needs or suggestions.
3. Group members visited libraries or educational resources at Wayne Community College, Sandhills Community College, Wake Technical Community College, Guilford Technical Community College, Lenoir Community College, North Carolina State University, the University of North Carolina at Chapel Hill, and the Lilly, Law, Fuqua, and Perkins Libraries at Duke University.
4. Group members attended Internet demonstrations and conducted their own Internet demonstration on campus.
5. Group members attended the North Carolina Department of Community College's Institutional Information Processing Service (IIPS) conference and observed demonstrations of multimedia and the Internet and attended a teleconference on Free Net and a presentation on the North Carolina Information Highway (NCIH).
6. Group members read and circulated books, articles, and other information on technology.

Managing Instructional Processes. The Managing Instructional Processes Study Group examined ways to expand faculty use of technology, including word processing, test banks, and grade management. The group used the following data collection methods:

1. Group members studied the results of the Steering Committee's surveys.
2. The group conducted its own survey to gather additional information on the use of computers for instructional management.
3. Group members interviewed faculty from several programs to determine their technology needs.

Technology Training (Joint Study Group). The Joint Technology Training Study Group was charged with developing a plan for training faculty and staff in the use of technology. The group used the following data collection methods:

1. Group members reviewed the results of the Steering Committee's surveys and determined that more detailed information on training needs would be required.
2. The group developed a needs assessment instrument, and a pilot needs analysis was conducted during spring 1994 in the Adult and Continuing Education Division. This assessment instrument was refined by the group for future use by the College.

Problem Identification

Based upon data collected by the study groups, the Instructional Technologies Planning Committee identified problems and needs relevant to the use of instructional technology. The data clearly confirms the necessity of employing new teaching methods

through new technologies for matching the needs of diverse learners. The College's public constituencies are demanding more than ever that its academic programs be accountable through efficient and timely instruction for producing a competitive workforce. However, with its limited resources, aging equipment, and traditional teaching methods, the College is challenged to meet these expectations.

The Classroom Technologies Study Group identified multimedia as a means for an alternative teaching strategy to meet the complex educational needs of the students. Well-designed multimedia has been proven, as countless studies confirm, to be effective and efficient, in addition to offering a new and interesting approach to presenting materials. Studies cite the educational merit of interactions using sight, sound, and simulated experiences in learning (G. Phillip Cartwright, "Do Computers Help Students Learn?" The Edutech Report, No. 9, December, 1993).

Other studies show that a single teaching method--most often the lecture format--does not effectively meet the needs of all learners. Traditional lecture-oriented teaching methods have proven ineffective with learners who are diverse in ethnicity, socio-economic background, age, culture, work experience, and educational attainment. On average, instructors spend about 80 percent of their time lecturing to students, and one week later students can recall less than one-fifth of the lecture material (Choosing the Future: An Action Agenda for Community Colleges, Report of the Commission on Innovation to the Board of Governors of the California Community Colleges, October, 1993).

The Classroom Technologies Study Group found that the problems associated with the use of multimedia-enhanced instruction at the College fell into two distinct categories:

awareness and feasibility. There is a small cadre of faculty members who are aware of the benefits of multimedia and have used the technology. Most faculty members, however, have not had access to computers and have limited familiarity with multimedia for instructional delivery. Two open-ended interview questions were asked: "What technology would you like to be able to use in your classroom?" and "What types of support services do you think you will need in order to use the technology effectively?" Most of the faculty requested slide projectors or video cassette players. The support services requested focused on repairing or replacing existing equipment. With the exception of the Health Technologies programs, which regularly use some form of multimedia instruction, the most advanced equipment requested was a classroom computer.

Faculty having more experience with multimedia responded differently. They mentioned start-up, on-going, and replacement costs of hardware and software as problems. Other concerns targeted labor costs for ongoing use of the technology and the time required for initial and advanced training, for evaluating available resources, and, most importantly, for faculty to produce multimedia materials.

Respondents to the Instructional Computing Survey indicated that most faculty members do not have convenient access to a computer and that lack of equipment and software seriously limits the use of computers in instruction. Too, a large percent of the faculty lacks basic computer skills and the foundation for using multimedia or other forms of instructional technology. Hence faculty access to a computer and computer literacy are obviously high priorities for an effective faculty development program for optimal use of instructional technologies. Such provision of equipment and training should ensure increased

awareness of technology applications for the classroom. Once these steps are taken, most faculty members should be ready to utilize new instructional technologies. Faculty members with computer literacy are now poised for training in multimedia technology. Hence the College must acquire the resources and invest in training the faculty in using the latest teaching methods.

Along with multimedia, distance learning must be incorporated into instructional programs. The Colleges has applied for an ITFS license which will provide wireless communication over four channels. The College is scheduled to connect to the North Carolina Information Highway (NCIH) within the next two years, which will allow for two-way interactivity between an instructor and students at distant sites. The Internet is emerging as a significant tool for accessing information, such as the extensive resources of libraries and leading research facilities, data on job openings, medical information needed by students in Health Technology programs, and data of law enforcement agencies on crime activities needed by students in public safety courses. Selected faculty members should be trained to deliver instruction using distance learning methods.

The College's computer labs with limited hours and mostly out-dated hardware and software are inadequate to prepare students for using modern technology in the workplace. A survey of computer availability to students during the fall quarter 1994 revealed approximately 201 hours per week of open lab hours, with an average of 18 computers per lab available at any given time to be shared by 4,859 students.

Despite such limited open lab hours, students, especially in some technical programs, rely heavily on computers for instruction and assistance. Thus, increased student access to open computer labs is a major need.

Students in the Business Computer Programming, Microcomputer Systems Technology, and Office Technologies programs utilize most of the College's current open lab hours since they must use computer applications to complete course assignments. Accounting is a good example of a program in which students are dependent on computers for completing requirements for several courses. Students in Public Service Technologies use computers on a limited basis. Some courses in Paralegal Technology utilize legal on-line databases in the Educational Resources Center.

Some Health Technologies faculty members use computers for clinical simulations, classroom instruction, tutorials, and mock examinations. However, students in these courses have limited access to open computer labs to supplement classroom work. Thus, program directors must coordinate their needs with other programs to ensure student access to an open lab as needed. Some Health Technology programs have only one computer available for students, with some practice simulations available in the Campus Learning Center.

The Industrial and Engineering Technologies Department also offers some computer-based courses, such as Computer Aided Drafting (CAD) and Computer Aided Manufacturing (CAM). Also computers are used in the Electronics program and in some industry training, requiring students in these programs to have access to a computer lab to complete assignments.

The College Transfer Department uses computers to supplement mathematics and introductory Spanish courses; however, students have very limited access to the other departmental labs and otherwise have access only to computers in faculty offices and those in the Campus Learning Center. The General Education Department uses computers on a limited basis, with math tutorials available only in the Campus Learning Center. Increasingly students in English courses must use computers for compositions but have limited access to other departmental open labs.

All students have access to the Campus Learning Center for computer tutorials and word processing but with a very limited number of available stations; and during the 1994-95 academic year, some services in the center were even more limited by budget constraints. The Northern Durham Center has two computer labs open for general student use when classes are not scheduled; however, the labs are heavily used for classroom instruction.

The Continuing Education Deparment has one of the best equipped computer labs, a networked lab with 20 computers and a wide variety of current software. Hence during the 1993-94 academic year, 245 computer courses were conducted for industry or the general public with an enrollment of 2,678 students.

Because of the limited number of campus computers and the need to give priority to students enrolled in computer-based courses, many students lack access to a computer and, in some instances, the appropriate software to complete certain computer-based assignments. Ideally, to promote professionalism in students' work, any instructor should be able to require that a specific assignment be executed according to the same specifications of a potential employer. Yet, the instructor is reluctant to impose such requirements for students who

neither own a computer nor have ready access to the College's restricted computer resources. In all fields, however, ready access to computer technology can transform the way faculty teach and the way students learn.

Computer equipment that is normally out-dated in two to three years is utilized in labs for five to six years and is frequently incapable of running updated software. Applications are normally three to four versions out of date. For a College located adjacent to the progressive Research Triangle Park, this situation poses a serious threat to the College's ability to achieve its mission.

Through interviews, questionnaires, and meetings, the Learning Resources Support Study Group obtained a high level of response for identifying problems and recommendations for learning resources technology.

Most importantly, the College should provide students adequate access to the library's resources regardless of the class location--access which would be assured through a campus network. Faculty could search library databases from their offices or use the resources as part of class activities from any instructional site. To expand available resources, the library's CD-ROM products should be connected to the campus network.

The College's current on-line catalog system is out-dated and very slow. To facilitate services for the faculty, staff, and students, the catalog system should be replaced with one that is faster and that incorporates updated features and should be connected to the campus network for quick access from any institutional site with an on-line computer.

To improve informational services to all users, the Educational Resources Center (ERC) should have CD-ROM and laser disk players available to allow for viewing of

interactive videos and simulations. Also space and equipment should be provided for presenting on-line video conferences in the ERC, as well as connections to the Internet for accessing global information.

The Learning Resources Center provides an open computer lab for students on a first-come, first-served basis. However, most of the lab's mixture of hardware and software is outdated, and the lab should be equipped with new computers connected to the campus network and with access to all campus software. Lab staffing should be adequate to provide for open lab hours to assist students during all College operating hours.

Without the needed library technology, students requiring library cards must wait as long as three weeks for receipt through the mail. To remedy this problem, the College should adopt barcoding technology for standard student identification. The system could replace the current library card system and could be used during registration for searching student records. Also the system could be used by the Adult and Continuing Education Departments to account for the number of hours each student attends class, by the Financial Aid Department and the Business Office to process student accounts, and by staff for identifying users of any open computer lab.

Currently the College offers a sequence of foreign language courses in French and Spanish to enable students intending to transfer to a four-year institution to fulfill the foreign language requirement or to pursue advanced courses upon transfer. However, unlike many of the institutions to which students transfer, the College does not have a language laboratory to provide effective learning experiences through new technology. Hence, instruction in language courses is essentially lecture-oriented, offering students limited opportunities in

hearing and speaking the language. In the College's typical class, the instructor is the only speaker. However, more sophisticated multimedia applications for language instruction could integrate through advanced video graphics all aspects of the culture with the language--an experience which students lack through conventional classroom teaching. Students could learn at their own pace while being exposed to native speakers of varying social classes, ages, and backgrounds. Also the instructor could monitor individual student progress from a master control board and lead students in practicing oral skills. Currently students have access to only a few individual booths in the Campus Learning Center equipped with earphones and tapes for listening. The College's lack of technology for teaching languages places students at a serious disadvantage.

A comprehensive language learning laboratory needs to be installed. It should consist of a state-of-the-art language learning system with capability for CD-ROM products, interactive video, lab control electronics, at least 15 audio/video stations, four small group multimedia positions, software, and other essential accessories.

Many problems with using technology to manage instruction were identified through an analysis of the Steering Committee's surveys and from interviews. There were 118 respondents to the Instructional Computing Survey with only 37 percent indicating that they use computers for managing classes (grades, etc.). Sixty-six percent indicated they use computers for the preparation of class materials even though only 39 percent have a computer. The survey results indicate that 56 percent of the faculty find that lack of equipment limits their use of computers and 46 percent state that lack of software limits their use of computers. Other problems identified on the survey by 30 percent or more of the

faculty were lack of training, lack of time to learn, and out-dated or malfunctioning equipment. Fifty-four percent of the responding faculty stated that they receive no hardware support from Computer Services and an additional 24 percent rated the hardware support they receive as poor or fair. Fifty-seven percent indicated that they receive no software support from Computer Services, and an additional 26 percent rated the software support they receive as poor or fair.

For faculty having a computer, lack of compatibility of the College's hardware and software and limited access to printers create major problems. While a campus network would help solve some of these problems, most of the equipment is too obsolete to be connected to the network. Ninety-one percent of the faculty survey respondents indicated that their computer is not connected to any network at the present time.

Faculty interviews conducted by members of the Managing Instructional Processes Study Group elicited the following comments:

> There needs to be easy access to computers, as computers increase efficiency only when they are readily available.
>
> Training on hardware and software must be on-going and offered quarterly. Many instructors choose teaching without technology over working with existing technology because they are not comfortable working with the current system. In addition, part-time instructors must be paid to attend training sessions, as they are paid only for the hours in the classroom.
>
> Management of grades through networking must take into consideration that 50 percent of our instruction is delivered by part-time instructors. Thus, without training, a large number of instructors will be unfamiliar with the computer system.
>
> Repair of hardware must be a part of the overall plan. Durham Tech already has problems keeping its present equipment repaired. The cost of maintaining new purchases must be included in future budgets.

Technology can improve classroom management and, while enabling faculty to become more productive, can free them to spend more time interacting with the students. Technology can facilitate grade computation; preparation of syllabi, tests, and assignments; advising and tracking of students through access to current student records; and completion of paperwork such as FTE reports. Also improved communications through technology can expand the instructor's sphere of contacts via the Internet; improve communications with students through voice mail, e-mail, or the Internet; and enhance campus communications among the administration, faculty, and staff.

Through the use of instructional technology, the College expects significant transformation in the teaching and learning environment. Technology-supported teaching innovations can enable the College to move from lecturing to coaching, from library collections to network collections, and from passive learning to active learning. The College expects student achievement of course competencies to improve, accompanied by an overall increase in student satisfaction.

To ensure that training will be an integral component of the information and communication technology plan, the Steering Committee appointed a joint study group to investigate training needs of faculty and staff. The study group found that over half of the faculty and staff currently do not have convenient access to a computer and that many lack computer literacy. Other employees use computers only for word processing or to enter data to the Prime, the administrative computer. Very little use is made of advanced technology in faculty or staff applications. If technology is to be maximized, the College must provide

faculty and staff training concurrently with the acquisition of conveniently located hardware installed with software.

To determine the specific training needs, the College should administer a needs assessment instrument to all employees. Using results of this instrument, supervisors should work with individuals to determine the specific technology skills needed for effective job performance, and this information should be stored in a training database created to assist in matching training to individual needs.

Technology awareness seminars and computer literacy training should be available to all persons indicating a need. Also training alternatives should be developed to enable faculty and staff to increase their skills in the most effective manner. The training options should include self-paced modules, curriculum or continuing education courses, and outside third-party training. Much of the training should be geared toward standard software packages approved for the campus. Faculty and staff using other specialized software should take responsibility for their own training on the software; thus, training costs should be included in budget requests for new software.

Once the campus network is installed, faculty and staff will require an orientation to the use of the network and on-line software. Instruction must be provided for the use of e-mail. When the student database is available for faculty access, an additional training course will need to be established. The planned technology will be beneficial only when the faculty and staff are competent users.

A separate set of training needs exists for the Computer Services staff. These needs include network management, network connections and troubleshooting, UNIX systems

administration, TCP/IP training, and client/server programming techniques. Much of the training will have to come from outside third-party training facilities although Computer Services staff will take courses offered by Durham Tech or other community colleges when appropriate.

At least 75 percent of the faculty will require training in reorientation of teaching strategies when the technology is provided. While some training may result through awareness seminars and the technology fairs, more specific skills in the use of instructional multimedia should be provided through agencies such as the Institute for Academic Technology (IAT). Through such activities, selected faculty should receive in-depth training, develop and use multimedia in their classes, and become mentors for colleagues. In all areas of the technology, including e-mail and standard software packages, "super users" should be identified to provide assistance to fellow employees in the department or program.

Recommendations of the Study Groups

Each study group developed recommendations to be implemented over a five-year period to meet the needs identified during the self-study process. The recommendations are listed below by study group.

Classroom Technologies Study Group

1. Require a minimal level of computer literacy for faculty employment. Provide training and support for current faculty to reach this level of literacy.

2. Provide advanced training in the use of multimedia using the resources of the Institute for Academic Technology (IAT) to train at least one person per program.

3. Use the IAT-trained faculty as mentors to lead peer-group training. Grant each resource person release time to develop classroom materials and instructional strategies.

4. Provide a multimedia development lab for faculty.

5. . Provide mobile multimedia units for each instructional building.

6. Develop an in-house help desk manned by a computer expert during regular hours to meet the needs of faculty.

7. Provide a classroom in the new Technology Center that can be used for interactive distance learning.

8. Provide a long-range plan for distance learning including programming over wireless communications channels and use of the NCIH for instructional activities between the main campus and satellite locations.

9. Provide access for all full- and part-time faculty to e-mail, the Internet, and the NCIH.

10. Provide a centralized technology repair service to keep equipment operational.

Computer Labs Study Group

1. Provide three networked, open computer labs equipped with the latest hardware and software.

2. Provide the following staffing for the open labs: a computer center director, a lab technician, and six lab monitors (two for each lab so that one is on duty at all times). The lab technician should maintain and repair all of the hardware and software in the open labs. The lab monitors should manage the labs and answer general questions from the students.

3. Maintain open lab hours from 8:00 a.m. through 10:00 p.m. Monday through Friday and from 9:00 a.m. through 1:00 p.m. on Saturday and Sunday.

4. Establish one open lab each at the Northern Durham Center, the new technology center, and Room 70 of the White Building.

5. Provide students access to the following types of software applications: word processing, spreadsheets, graphics package, databases, and software that accompanies textbooks.

6. Maintain all computer equipment in good working condition.

7. Create ten specialized computer centers throughout the College with two to five computers in each for special areas such as chemistry, biology, math, etc.

Learning Resources Support Study Group

1. Install a network in the library in Year 1.
2. Purchase and install a Dynix Automation Center (or similar system) during the first year.
3. Install barcoding equipment during Year 1.
4. Purchase a fax machine and laser printer during Year 1.
5. Increase the number of computer work stations in the ERC during the first and second years.
6. Purchase and install a CD-ROM fileserver in Year 2.
7. Install in Year 3 a complete language lab staffed with a full-time lab attendant.

Managing Instructional Processes Study Group

1. Provide each full-time faculty member a computer and the appropriate software.
2. Establish a system by which every part-time faculty member has convenient access to a computer with the appropriate software.
3. Identify a standard software package for grade management and make it available to all faculty members.
4. Purchase scanners, one per building, which are able to interface with the administrative computer system.
5. Purchase and make available to all faculty software for test management, test banks, and word processing.

Technology Training Study Group

1. Provide adequate financial resources to support training activities.
2. Administer a skills needs assessment to all employees.
3. Establish a database to record current and needed skills for each employee.

4. Develop technology awareness seminars for training of faculty and staff and for orientation of new employees.

5. Provide training in computer literacy for any employee as needed.

6. Develop training alternatives to enable faculty and staff to have access to the specific training needed to enable them to perform their duties effectively. The training options should include training modules, curriculum or continuing education courses, and outside third-party training.

7. Develop training modules for each standard software package supported by Computer Services.

8. Develop and administer an evaluation instrument to determine the effectiveness of the training.

Expected Outcomes of the Recommendations

The following recommendations are based upon the efforts of four study groups of the Instructional Technologies Planning Committee, the Steering Committee, and the Coordinating Team. These recommendations serve to support and promote the College goals for the 1994-96 biennium and are directly related to increasing open-door access (College Goal 1), advancing student learning (College Goal 2), increasing mastery of general and program-specific critical competencies (College Goal 3), improving instruction (College Goal 3), and developing linkages with public schools and other agencies and institutions (College Goal 7).

Two primary outcomes which the Instructional Technologies Planning Committee expects to be derived from the implementation of the information and communication technology plan are for all students who attend Durham Technical Community College to (1) demonstrate enhanced knowledge and skills through the use of instructional technology in all disciplines and (2) develop computer skills necessary for their success in the work place or

other institutions of higher education. To reach these goals, faculty development is essential. As a result of the professional development program to be implemented as a part of the plan, all disciplines will incorporate information technology in their courses with the effect of increased student learning and faculty and staff will be better trained on the use of technology. In addition, some subgroups of students, such as the learning disabled or physically challenged, may benefit greatly through alternate forms of instruction using information technology which either supplements or substitutes for traditional lecture and discussion methods.

The following recommendations are directly related to College Goal 8, which is the enhancement of programs and services through the use of information technology. The recommendations are written in terms of expected student outcomes. The measurement time-frame will be dependent upon the implementation of the components of the five-year plan.

1. By the end of the first year, student evaluations of courses which utilize instructional technology will have statistically higher ratings when compared with evaluations of sections of the same courses which do not utilize instructional technology.

2. By the end of the third year, eighty percent of curriculum students will have campus e-mail access to make appointments with advisors and faculty and for instructional use.

3. By the end of the third year, seventy percent of students enrolled in selected courses will telecommute their assignments to their instructors.

4. By the end of the fourth year, twenty percent of the students will be taking courses through distance learning.

5. By the end of the third year, twenty percent of the students will be enrolled in courses that are student-paced through the use of technology.

6. By the end of the third year, forty percent of grade reporting will be accomplished through transmission via information and communication technology.

7. By the end of the third year, ninety percent of students will have access to the automated library system.

8. By the end of the third year, ninety percent of new students will have participated in an orientation program accessed by information and computer technology.

9. By the end of the third year, sixty percent of students seeking jobs will utilize an electronic job search available over the campus network.

CHAPTER 4: REPORT FROM THE ADMINISTRATIVE SYSTEMS PLANNING COMMITTEE

Purpose and Objectives of the Study

The Administrative Systems Planning Committee (ASPC) was established as a principal committee of the 1994-96 Self-Study Steering Committee. Its purpose was to study administrative operations and recommend strategies for improvement through information and communication technology, to design an implementation and training plan, and to establish an evaluation process and revision schedule for the plan. This purpose was stated as a goal and adopted in February 1994 by the Steering Committee, and the following objectives were developed to delineate the goal:

1. To develop an information program for administrative staff needing to understand the implications of information technology for their daily tasks.
2. To develop a needs analysis that provides an accurate and timely profile of current administrative operations.
3. To determine desired outcomes of using information technology to support administrative functions.
4. To examine available software, hardware, and an infrastructure to provide information technology support for administrative operations.
5. To derive a strategy for improving administrative operations with information technology.
6. To develop implementation systems with established priorities, a phased-in approach, a training model, and an evaluation plan.
7. To establish policies and procedures to maximize the sharing of facilities and resources.
8. To implement the strategy in conjunction with the administrative systems work groups.

9. To collaborate with the Instructional Technologies Planning Committee on issues of mutual concern, including electronic mail, access to student records, access to the North Carolina Information Highway (NCIH), and other external databases.

10. To monitor the implementation of the information and communication technology plan for continuing evaluation and revision to meet the College's current and future needs.

The committee chair and vice-chair, with advice from committee members, developed goals and objectives which were endorsed by the Steering Committee on February 18, 1994.

Methodology

The committee employed several methods of gathering information for the final report. Information gathered by the Steering Committee and the ASPC study groups contributed to the final report.

The Steering Committee conducted an inventory of hardware and software and surveyed administrators, faculty, staff, and students to ascertain the degree of satisfaction with current technology and technology support. The vice-chair of the Steering Committee summarized the survey results for review by the ASPC and the study groups.

The Coordinating Team established study groups and assigned the following to the ASPC: (1) Telephone System; (2) Administrative/Academic Computing Support Services; (3) Enhancement of Adult and Continuing Education Operations; (4) Physical Plant and Other Auxiliary Services; and (5) Word Processing, Clerical Support, Printing Services, and Publications. The following study groups were established jointly with the Instructional Technologies Planning Committee to explore issues common to administrative and instructional areas: (1) Infrastructure/Internal Communications, (2) Student Information

Systems, and (3) Technology Training. (See Appendix A for the membership of each study group and its charge.) Upon reviewing its charge, each study group investigated an assigned area, as summarized here. The Coordinating Team decided that the Infrastructure/Internal Communications (Joint) Study Group and the Student Information Systems (Joint) Study Group would be included in the Administrative Planning Systems Committee report.

Infrastructure/Internal Communications (Joint). The study group used the following data collection methods:

1. The group identified existing equipment, wiring, communications, and interactions needed to accomplish specific tasks; identified the communication problems and needs as perceived by user; made site visits; and examined products through meetings with local vendors and visits to trade shows.

2. The group examined the State Telecommunications Services document STS-1000 Telecommunications Wiring Guidelines, State Information Processing Services (SIPS) Systems Integration Services documents 04.03.10 Technology Standards and Supporting Products for Local Area Networks and 04.03.020 Requirements and Procedures for Installing Local Area Networks and North Carolina Information Highway Premise Infrastructure User Guide, Part I: Site Preparation Guidelines prepared for SIPS by J. S. Hendricks, Building Industry Consulting Service, and other technical articles to determine the State's standards and current technology recommendations from SIPS. The group also studied additional technical articles recommended by committee members.

3. To determine needs for the College's infrastructure and internal communications, group members reviewed results of the Instructional Computing Survey, the Administrative/Staff Computing Survey, and the Student Survey of Campus Computing. The group interviewed seventy-eight persons to determine communication methods and needs, including two deans, five associate or assistant deans, 18 program directors or coordinators, eight instructors, 16 administrative or staff members, and 29 students.

4. To increase their understanding of infrastructure components, as well as their knowledge of activities and accomplishments in other institutions, the group made site visits, attended seminars and trade shows, and consulted with field experts. Various group members participated in the following activities:

April 12 - Seminar at Durham Tech on Networking, with an emphasis on the Internet, presented by Curtis Edge and Robert Gotwals, Jr., from MCNC;

May 13 - Panel Discussion at Durham Tech on the NCIH and Its Implications for Community Colleges presented by Parks Todd, Dennis Perry, and Gail Corrado;

May 18 - Meeting at Durham Tech with Herman Markowitz, IAT consultant, to discuss infrastructure alternatives;

June 8 - An overview at Durham Tech of voice communications presented by GTE representatives;

August 3 - Site visit to Catawba Valley Community College, Hickory, N. C.;

August 3 - Novell seminar, Raleigh, N. C.;

August 8 - Consultation with Carolina Cable, Durham, N. C.;

September 8 - Visit to the Terry Sanford Institute for Public Policy, Duke University, Durham, N.C.;

September 11-14 - Networld/Interop 94, Atlanta, Ga.;

September 19 - Piedmont Triad Computer Expo and Solutions Series of Seminars, Greensboro, N. C.;

September 23 - Consultation with Carolina Cable, Durham, N. C.;

September 29 - Visit to Fayetteville Technical Community College, Fayetteville, N.C.;

October 7 - Visit to the North Carolina School of Math and Science, Durham, N. C.;

October 11 - Seminar on ATM presented by Cisco Systems, Inc., Holiday Inn, RTP,N. C.;

October 12 - Netcom '94, Charlotte, N. C.;

October 13 - Seminar at Durham Tech on Connection Options to the Internet presented by Shava Nerad Averitt, OIT Internet consultant, University of North Carolina, Chapel Hill, N. C.;

October 21 - Visit to Forsyth Technical Community College, Winston-Salem, N. C.;

October 26 - Consultation at Durham Tech with David Cates, Custom Cable Systems and Networks, Inc.;

October 27 - Consultation at Durham Tech with cable installer, Robert Rigsbee, Quality Communications, Inc.;

October 26-27 - Computer and Office Systems Show, Raleigh, N. C.;

October 31 - Consultation at Durham Tech with cable installer, Alan Pizytulski,Tech Datacom Systems, Inc.; and

November 7 - Cabletron System, Inc. Proposal for the Infrastructure presented by Bob Blum at Durham Tech.

Telephone System. The study group used the following data collection methods:

1. The group met several times to discuss ways of gathering data, including surveys, printed material on telephone systems and information technology, and visits to other colleges.

2. The group collected information from the manager of Clerical Services on the current telephone system, including the number of stations in each campus building, types of telephones, and number of state network lines and trunk lines.

3. The group reviewed and discussed a report on telephone needs based on a faculty/staff survey of selected faculty and staff.

4. The group participated in the following activities:

   a. GTE's overview and discussion of several options for upgrading/replacing the telephone system and a follow-up cost proposal based on a comparison of the PBX and CentraNet systems;

   b. Presentation by Roy Cappadona, associate director, Data Operations and Telecommunications, North Carolina Central University, consisting of an unbiased overview of NCCU's system, outlining the advantages and disadvantages of purchasing a PBX system or leasing CentraNet services;

c. Meetings with Charles Dail, chairperson of the Information and Communication Technology Advisory Committee, and Robert Gordon of Central Carolina Bank, to analyze the two systems;

d. Meeting with Tom Walton from State Telecommunications to review purchasing procedures for telephone systems;

e. Presentation by GTE at a Northern Telecom facility to discuss the PBX and CentraNet proposals. The group observed GTE's proposed PBX system and a demonstration of the software available to make "Adds, Moves, and Changes" with the CentraNet option and the telephone equipment available for purchase;

f. Hosting an open forum to solicit faculty and staff input on telephone system needs;

g. Meeting with Robert Gordon and Donna Edwards at Central Carolina Bank to review our needs and proposals from GTE and solicit input;

h. Attending a presentation by Dr. Sylvester McKay, Guilford Technical Community College, on technology related to telephone registration;

i. Meeting with GTE to clarify questions about their telecommunication proposals, analyzing findings from a traffic study conducted by GTE, and discussing ways the College can respond to their findings with the current PBX system; and

j. Meeting with Paul House, director, Market Development, Northern Telecom, to solicit input on telephone system needs and comparison with GTE's proposals.

Student Information Systems (Joint). The study group used the following data collection methods:

1. The study group formed three focus groups to examine student services, advising, and related security issues. The career planning and placement coordinator and the counselor explored student services. The advising coordinator explored advising, and an instructor from the Business Administration and Business Computer Programming programs and the security coordinator explored security issues.

2. The student services focus group gathered information through meetings with staff from Admissions and Registration, Financial Aid, and Counseling Services.

3. The advising coordinator gathered information through interviews with faculty/staff and department assistants for the College Transfer and Developmental Studies programs, review of advising literature, and review of information gathered by other study groups and a survey conducted by the Advising Advisory Committee.

4. The advising coordinator conducted a telephone interview with a programmer/instructor for IIPS software at the N.C. Department of Community Colleges concerning computer-assisted advising, visited other colleges to observe advising programs, and conducted informal interviews during the 1994 North Carolina IIPS conference.

5. The advising coordinator compared those interview responses with those gathered by the Administrative/Academic Computing Support Services study group and recorded and tabulated responses to the "Advising and Access to Student Information Questionnaire."

6. The focus group on related security issues conducted interviews with the director of Admissions and Registration and the systems analyst in Computer Services. The interviews included a detailed and expansive questionnaire. The six critical areas covered employee management, system development, input controls, on-line processing, software safeguards, and output controls.

7. The focus group researched specific college documents, articles, and publications concerning electronic data processing auditing and security problems in current computer operations.

Administrative/Academic Computing Support Services. The study group used the following data collection methods:

1. The group conducted interviews with IIPS software users in the following areas on the following dates:

   June 7, 1994 - Adult and Continuing Education Division
   June 15, 1994 - Student Services and Academic Services Divisions
   June 23, 1994 - Business Office and Human Resources Department
   June 28, 1994 - Library, Campus Learning Center, and Institutional Research

July 6, 1994 - Faculty members and members of the Student Information Services Study Group

2. Group members attended three training seminars on information technology terminology, concepts of the UNIX operating system, and networking concepts.

3. Between July 3 and September 13, 1994, group members met with Computer Services staff to obtain information on the department's needs.

4. Each group member met with a key person from an assigned departmental area to gather further information on needs.

Enhancement of Adult and Continuing Education Operations. The study group used the following data collection methods:

1. From July 12 through August 2, 1994, the group interviewed staff to identify strengths, weaknesses, needs, and the current technology.

2. The group reviewed the following documents: the Administrative Staff Computer Survey; the divisional effectiveness plan; and a position paper titled "Positioning Adult and Continuing Education for a Leadership Role in Information Technology at Durham Technical Community College."

3. Group members visited Wayne Community College to observe use of information technology.

4. Group members attended various College-sponsored activities to gather data on current technologies, including multimedia demonstrations; a technology fair; and sessions on computer vocabulary, computer networks, hardware/software standards, and the current telephone system.

Physical Plant and Other Auxiliary Issues. The study group used the following data collection methods:

1. On May 16, 1994, the group met to determine areas for study and to establish goals and objectives.

2. On May 18, 1994, the group met with the director of Auxiliary Services to define staff duties, and on June 22 to finalize goals and establish a calendar.

3. On August 4, 1994, the group interviewed departmental personnel and administrative staff and met afterwards to discuss identified problems. Also a group member arranged a meeting with Central Carolina Bank officials for October 26 to discuss their facilities and managerial functions. Similar but unsuccessful attempts were made with other organizations.

Word Processing, Clerical Support, Printing Services, and Publications. The study group used the following data collection methods:

1. The group examined the current equipment used for printing and publications.

2. The group interviewed staff and analyzed results of a 1992 Communications and Marketing Survey to determine how well printing and publications needs are being met.

3. The group examined press counts for jobs completed on two offset presses and copy counts from the Xerox 1090 used in the printshop.

4. The group reviewed the Administrative/Staff Computing Survey focusing on the responses given by clerical and support staff.

5. Interviews with clerical staff were conducted to gather more specific information about training needs, hardware/software needs, availability of IIPS software, and limitations of computer access.

6. The manager and staff of the word processing center were interviewed to determine the specific needs of the center for providing information technology services to College personnel.

Problem Identification

. Based upon extensive data collected by study groups, the Administrative Systems Planning Committee (ASPC) identified problems and needs resulting from lack of an infrastructure, equipment, and software to support a campus-wide technology plan. The proposed five-year plan consists of a fully networked campus to support instructional and administrative functions along with a new telephone system. The following analysis addresses major problems identified by study groups from the ASPC.

The College must implement a campus network to provide employees access to institutional data for performing essential instructional and administrative functions. Furthermore, because the College's current Prime computing system is becoming dysfunctional and is accessible to only a few employees, a new Unix-based system needs to be implemented.

With the current Prime system, outmoded connections and the need for multiple passwords result in slow and intermittent access to the computer database for its limited users. For example, Human Resources staff cannot manage and update personnel files, Business Office staff experience slow accounts receivable and cannot enter financial information into several different files for processing on the central computing platform nor generate individual student invoices, employees lack machine-readable archives of internal and external survey information with archive data captured only at the ends of quarters for trend analysis, academic program costs analysis is unavailable, and academic supervisors cannot efficiently manage part-time faculty contracts and follow-up documentation.

Without a network to access essential data, students cannot acquire vital information on schedules, plans of study, course descriptions, faculty schedules, and other data without visiting the appropriate campus office. Human Resources staff cannot access and update personnel records to verify faculty credentials, identify teaching qualifications for multiple areas, or determine instructors' availability for various assignments. Academic advisors cannot determine grades, transfer credits, academic progress, program requirements, and other information for assisting students in achieving their objectives. To solve such problems, on-line computers and software applications must be available to enable the advisor to maintain academic records, monitor changes in academic requirements, and promptly inform students on any changes in their plan of study. On-line computers should be available to all faculty for updated advising, and software programs should be available for tracking students, beginning in Developmental Studies.

To solve such problems, the College must create an infrastructure to support the networking, equipment, and software applications required for using new technology.

A major administrative problem involves the College's current programming and operational support of the IIPS software, written eight years ago in the InfoBasic language as an interpretative language integrated into the system. The package provides financial, personnel, purchasing, course scheduling, and student records, along with registration components to meet requirements of the Department of Community Colleges (DCC). Since the Department is moving the IIPS software package to three UNIX-based platforms, the software will be translated into an interpretative application environment called TOADS

(Total On-line Application Development System) to facilitate movement of the database files from Prime to the UNIX platforms without conversion.

This change will require training in C, TOADS, and UNIX; a LAN between offices; software to download from Prime into PC-based spreadsheets and database file formats; network management software; a modem and workstation for managing the Novell network; at least one of each manufacturer's type of PC to determine the best hardware and software and to save set-up time; a Novell LAN to be able to qualify network components; a laptop with Novell Netware diagnostic software for troubleshooting networks; CD-ROM drives and memory and hard drive upgrades for PCs so Computer Services staff can run the latest versions of software; tools for making and repairing cables; a network protocol analyzer; network administration software utilities for Novell; software to track the inventory of software and hardware; hardware spares; and more tables and work space for using equipment.

To implement a campus network, wiring must be installed to connect all instructional and administrative facilities for access to video, the central computing databases, and applications software for more efficient use of College resources.

Currently the College uses a wide variety of computer equipment, including modems, multiplexors, and printers connected to a few local workstations without optimal use. Computers include a Prime 4150, two HP 9000 mini-computers, IBM compatibles and clones, the Macintosh, and Apple; modems include Hayes, Multitech, Practical Peripherals, Everex, and compatibles. Printers include Printronix, Epson, IBM, Okidata, and others.

Prime has two gigabytes of storage, one reel-tape drive, one 8mm-cartridge drive, and 124 asynchronous ports. Sixteen ports are used for printers and the rest for terminals.

Due to Prime's capacity and the lack of networking, only a few employees from the Business Office, Admissions and Registration, and Adult and Continuing Education use the system for e-mail and financial and student information applications. Most users in the White Building and Educational Resources Center are wired point-to-point, with some connections having two- or three-pair category 3 UTP wires. Each multiplexor can accommodate either eight or 16 asynchronous pieces of equipment and uses two pairs of category 3 UTP wires. To access Prime, the Adult and Continuing Education Center relies on a pair of multiplexors with UTP category 3 wires and the Northern Durham Center on an asynchronous data switch box with a leased line. Other sites, such as the Small Business Center, Industrial Skills Center, and Newton Building, rely on modems for connection. The Collins Building, a central campus building, is not connected to Prime.

The College plans to replace Prime with a campus computer operating in the UNIX environment and fully networked. With only a few local PC networks, such as in the Adult and Continuing Education Center and the Educational Resources Center, access to a server is limited. No workstations are connected to a network to access any server. With a fully networked campus, most existing PCs could access data and software applications and hence increase employees' ability to perform essential tasks while decreasing costs. However, many employees do not have computers, and much equipment and software are obsolete.

Because a campus network is essential for communicating both on campus and with off-campus sites, the College must develop a long-range plan for an infrastructure to support

a campus network and ensure optimal use of new or existing hardware and software. Sixty percent of the respondents in the Administrative/Staff Computing Survey rated "improved communications" as a requirement for improved job performance. However, the College is able to purchase a license for only enough copies of software to meet peak demand. Also software on stand-alone classroom computers is subject to frequent erasure and hence more expense.

A network would enhance user services. For instance, tutorials and practice activities could be accessible from any site, and library holdings could be accessible from all instructional locations to enable research to be a viable learning experience. With a modem, students could access software from any location. Compared to such benefits to students, along with increased administrative services, the cost for networking is minimal.

Comments from interviews and surveys reflect problems and needs resulting from lack of a network. As one administrator commented, "It is easier for deans and Executive Council members to communicate because we have people to do it for us. It is not easy for the office staff or the instructors and program directors. They need more efficient means of communication." Most respondents to the Administrative/Staff Computing Survey and the Instructional Computing Survey agree.

A network would also provide eventual access to the North Carolina Information Highway (NCIH). The NCIH was developed to connect state government agencies, universities, and community colleges and was endorsed by the Department of Community Colleges for accessing a wealth of information, including access to the state's most extensive

libraries, leading research facilities, and the most powerful computing centers. Connection will expand distance learning possibilities for students.

Along with planning for a campus network, the Steering Committee appointed a committee to develop and review standards for hardware and software to insure adherence to infrastructure specifications. Since equipment standardization will ensure interoperability, the College should select reliable local, regional, and national manufacturers for long-term economy and performance. Scalability and extended capability will be essential for future investments.

The network is also essential to provide access to library resources, including the card catalog and CD ROM products, from all instructional sites and faculty offices, and to provide e-mail services between the library and other locations. Updated computers and software would serve resources through barcoded user IDs. Also the library should become the site for an Internet node.

Networked equipment and software are mandatory for efficient business office functions. Administrators need on-line accurate budget information for accountable fiscal management. Business Office staff should have an on-line computerized system for managing accounts receivable, student invoices, delinquent accounts, payrolls with deductions and benefits, academic program expenditures and encumbrances, employment contracts, and word processing for spreadsheets and database capability.

A network to allow access to the College's database is vital for consolidating institutional research. Campus units produce numerous reports and data required by the N. C. Department of Community Colleges as well as the federal government. The College should

have a central office with networked computer and software to manage all institutional data, oversee archiving of data files, and conduct studies related to institutional effectiveness. Too, institutional research should be accessible to all faculty and staff via the network. An on-line information system would serve a variety of needs, such as providing data on the operating costs of each curriculum program correlated to institutional revenues. Because on-line data is constantly changing, replicating some statistics is impossible. Therefore, subsets of data should be extracted from the on-line system at scheduled times and stored on a file server so that all units will generate the same statistics.

Data that should be extracted from the archived files have not been identified; and without archived files containing critical data, some institutional research is difficult. The goal is to have the archived data accessible via the network to all research staff as well as other users.

The data should be in standard file layouts and in a format usable (ASCII) by a fourth generation programming language like SAS. Since the Department of Community Colleges has a site license for SAS for the PC, the research staff should use SAS for merging files and analyzing data. Such analysis over time is important since files from several quarters or years may be merged or concatenated for use in a single analysis. Although some files produced for the Department of Community Colleges are saved, Computer Services staff does not have a procedure for archiving data.

A campus network with appropriate equipment and software is essential for providing on-line information and hence optimal services to students. Current manual processes

involving voluminous paperwork should be replaced with a streamlined automated system.

From surveys and other research, study groups identified major needs for:

1. An automated registration procedure to alleviate the current cumbersome and time-consuming system, manage class sizes, determine additional sections, and improve academic advising;

2. Data on financial aid and scholarships for students purchasing textbooks or needing credit for tuition awards, and data for staff to avoid duplicate awards during busy registration periods;

3. More convenient advising and registration by telephone;

4. Updated academic data such as grades, course status and financial aid, placement test schedules and test results, transcripts, transfer credit, and other information;

5. A computerized system for tracking individuals who inquire about admission so that follow-up mailings can be used to recruit potential students;

6. A computerized system for tracking international students to ensure compliance with complex and changing laws and policies;

7. A read-only electronic system accessible to students from home providing information on faculty schedules, registration dates, policy/course changes, curriculum changes, catalog course descriptions and prerequisites, job opportunities, and other matters;

8. A database in the Career Placement Center to notify students of job openings and assist with employment;

9. A database to manage and monitor student residency requirements mandated by state statutes;

10. A system to enable Student Services staff to access data electronically from remote sources to reduce research time in the Student Records, Admissions, Counseling Services, Career Planning and Placement, and Financial Aid departments;

11. Increased number of teletype machines available to hearing-impaired students to allow access from more than the one current campus location; and

12. Quicker access to the computer database than provided by the current IIPS system which is slow and does not allow users to access files simultaneously or switch from one module to another without entering a new password.

One of the most important student services is academic advising which assists students in making good academic decisions and career choices. Students need timely and accurate information on program/course requirements, course planning and scheduling, and registration procedures. With networked computers and access to student data, advisors could provide immediate and accurate information during registration, and the advising coordinator could generate current data for advisors, convey essential information to students, and access up-to-date information from the on-line database.

Adult and continuing education programs need a networked registration system to accommodate large numbers of registrants on varied schedules throughout the year. However, the current manual system requires class time for the instructor to complete the process and collect fees. Also more terminal ports are needed to avoid duplication of files; to provide more timely input of grade reports and student records, registration data, instructor contracts, instructional time, GED test scores, fire school completion, student tracking, program evaluation, grant applications, and survey results; and to archive data for better program management and research.

Campus communications could be greatly enhanced with electronic bulletin boards and a kiosk system to provide timely and accurate information. Survey responses indicate that employees need to be informed of changes affecting job duties and students need to be informed of campus activities. A kiosk station could distribute information via coaxial or fiber cable to a non-interactive screen from a central location, with data entered and displayed at

multiple sites to reach different campus populations. As a non-networked system that could be updated via a dial-in or floppy disk and information retrieval via multiple-layer menus, the kiosk could be installed at central campus sites, shopping malls, area libraries, or other locations. Employees and students interviewed expressed a great need for the type of communication provided by a kiosk; for example: "On a recent shopping trip to Atlanta, I had a chance to use some touch screen information stations in the malls. I found them to be very informative, user friendly, and non-threatening."

Survey responses indicate that a campus communications problem could also be alleviated by an electronic bulletin board, a computer-based interactive system for registered users through which information is retrieved by keyword queries or dial-in access with a password. Faculty, staff, and students would have access to information on their desks or at kiosk information stations placed strategically throughout the College.

The current first-come, first-served student enrollment system could be eliminated with the installation of kiosk and telephone registration systems. With code access, the process could become more streamlined, flexible and time-saving for students and reduce the staff time required for setup and management. Survey respondents noted concerns such as, "I need to save as many days of my vacation and sick time as possible to take care of home emergencies...I have three children and a very unstable job situation," or "I need to conserve as much money as possible, and driving from Chatham County to Durham to stand in line all day is not cost-effective for me."

One of the College's most critical needs for improving communications is to replace the current PBX telephone system installed in 1984. The system lacks sufficient trunk lines

to manage the volume of calls, and the hardware and software cannot be upgraded. The telephone system study group concluded that the College requires a system with automated attendant for conveying essential messages regarding inclement weather and other unforeseen schedule changes; services for the hearing-impaired; "dial by name," a toll-free line; Tri-wide calling, multiple-party conferences, faxing, and other capabilities; and system management software. Also the system should provide connection to the administrative network for accessing student data and for simultaneous transmission of voice data and images over single lines. For students, more secured campus pay phones should be available.

A major communications problem results from the lack of e-mail service for most employees. Currently e-mail is available to only a few employees due to the limited capacity of the administrative computer. Campus-wide e-mail could greatly enhance the overloaded and inefficient campus mail system, replace redundant paper work, and improve efficiency in all campus communications. E-mail would improve communications between students with limited presence on campus and the large number of part-time instructors without offices. The Adult and Continuing Education Division has a special need for e-mail to improve communications among its geographically dispersed programs in downtown Durham, local high schools, and other numerous off-campus sites. Most respondents in the Administrative/Staff Computing Survey and the Instructional Computing Survey expressed the need for e-mail services, as reflected in this typical response: "[Need] e-mail with other colleges [and] to facilitate global communications," or "We need e-mail access, some easy, organized way to communicate."

Interviews held with plant maintenance personnel revealed a need for computerized systems to replace manual operations for greater savings in time, costs, and efficiency. The following specific problem areas were identified:

1. Outdated heating systems and air conditioning units, with thermostats controlled manually, resulting in inefficient service and costly maintenance;

2. Lack of an automated record keeping system to maintain locks and keys for plant facilities;

3. Need for a larger work area for effectively using a new mail machine equipped for computerized record keeping and capable of barcoding;

4. Need for a computerized system of inventory control and ordering of supplies and equipment;

5. Need for a computerized system for generating and monitoring work orders for routine campus maintenance; and

6. Need for a maintenance system for equipment throughout the campus, such as copy machines, computers, college vehicles, and specialized laboratory equipment.

All study groups identified faculty and staff training as a significant need as the College develops and implements its technology plan. The following special needs were identified by the joint study group on training:

1. Lack of a systematic schedule for training faculty and staff in use of new equipment and upgraded software applications, such as modifications in IIPS software;

2. Need for developing an employee skills database;

3. Need for training in C and TOADS as soon as possible or training on UNIX as both a user and as a system administrator and network administrator;

4. Need for training in accessing servers over the network; use of e-mail, word processing, spreadsheet and business graphics packages; and uploading and downloading files to and from the various servers on the network.

With the anticipated entry of much new technology into an environment that has had only a moderate amount, the College must establish new policies and procedures for the following:

1. Installment of databases on a central system rather than on local or private personal computers;

2. Standards for hardware and software use;

3. Software license agreements for bulk purchases;

4. Standards for replacement computer of components, network connectivity, cables, cards and software;

5. Regular attendance of training classes as part of the job requirements;

6. Upgrading of hardware and software on a regular basis; and

7. Guidelines for content of e-mail messages.

Recommendations of the Study Groups

Each study group developed a list of recommendations to be implemented over five years. Recommendations are based on the needs of the College related to the specific issues studied. No comparison of implementation strategies among study groups was made until all reports had been completed.

Recommendations are summarized based on weaknesses identified by study groups in the categories of communication, data access, limitations of the physical plant and connection to off-campus sites, maintenance and updating of college equipment and facilities, training, and staffing.

Each recommendation is referenced to the study group reports using the following codes: INF, Infrastructure/Internal Communications; TEL, Telephone Systems; SIS, Student Information Systems; AAS, Administrative/Academic Support Services; ACE, Enhancement of Adult and Continuing Education Operations; PPA, Physical Plant and Other Auxiliary Services; and WPC, Word Processing, Clerical Support, Printing Services, and Publications.

Communication. The following recommendations address the need for installation of a College network, computer equipment, and utility software to support College-wide communications:

1. Install a fiber backbone network with copper to the desktop for the first two years since other elements of the plan are dependent upon a College network. (INF)

2. Install fiber optic cable connections to the Northern Durham Center and the Small Business Center via ISDN lines with a new telephone system. (INF)

3. Plan wiring for each new construction project. (INF)

4. Train employees to support the network and provide maintenance contracts for hardware and software. (INF)

5. Delay connection to the North Carolina Information Highway (NCIH) until opening of the new Technology Center on the main campus. (INF)

6. Install phone lines, an Internet node, server, and modems for faculty, staff, and student access to NSFnet and the Internet. (INF,AAS)

7. Install GroupWise as the standard electronic mail package for the College network. (INF, SIS, AAS)

8. Install a character generator system to facilitate the implementation of a video bulletin board. (INF)

9. Purchase and install software for a College electronic bulletin board. (INF)

10. Install microcomputer information stations for student/public access to College information. (INF, SIS)

11. Purchase and install six information kiosks in campus buildings. (SIS)

12. Work with Duke University and North Carolina Central University to install an information kiosk in a highly visible location to promote public relations. (SIS)

13. Install a telephone system with multiple features compatible with emerging technologies and with ease of maintenance and management. (TEL)

14. Purchase a new hardware platform with network capability to run an operating system adhering to open systems standards. (AAS)

15. Provide dial-up access to the mainframe computer system through the College network. (AAS)

16. Provide surge protection and uninterruptible power sources for all computer systems and the network. (AAS)

17. Purchase site licenses for networking software. (AAS)

18. Provide Computer Services staff access to a separate network for programming and computers meeting College hardware/software standards. (AAS)

19. Maintain an inventory of spare parts for computer repairs. (AAS)

20. Purchase network cards for currently owned microcomputers. (AAS)

21. Develop policies for implementation and expansion of information technologies. (AAS)

22. Purchase and/or upgrade microcomputers for clerical staff. (WPC)

23. Upgrade publications equipment to allow for development of quality graphics for classroom presentations. (WPC)

Data Access. The following recommendations address employees' need for access to information to perform job duties effectively:

1. Implement enhancements to the master student database system software to serve faculty, staff, and student needs. (AAS)

2. Purchase a server for relational database programming to allow downloading of student files into a format that can be used by faculty, staff, and students without damaging the integrity of original data. (AAS)

3. Consider replacing the current student records and financial records software package during the fourth year of the initial information technology plan. (SIS)

4. Implement scanning technology for faster inputting of student admissions, attendance, and status information. (SIS)

5. Record, electronically, part-time faculty teaching hours through the use of bar-coded ID cards. (AAS)

6. Increase faculty and staff access to student records for advising, counseling, reporting, and emergency situations. (SIS)

7. Increase student access to their own records and information about College services. (SIS)

8. Provide students access to national and international databases for exploring other educational opportunities including transfer and financial aid sources. (SIS)

9. Provide students, faculty, and staff access to a database of community services. (SIS)

10. Increase the ability of students and staff to track applications for admission and financial aid. (SIS)

11. Purchase an inventory control package for managing the software inventory. (AAS)

12. Purchase form generation software for financial processes. (AAS)

13. Study business office and human resources office operations to determine enhancements to the IIPS software to refine procedures used for payroll, accounts receivable, personnel records, check writing, etc. (AAS)

14. Implement a telephone registration process. (AAS, SIS)

15. Connect the bookstore to the College network for charging student materials to financial aid accounts. (AAS)

16. Provide electronic transmission of rosters to faculty and of reports to the FTE coordinator and the student records office. (SIS)

17. Purchase a contacts database to track admission information and produce written communication to potential students. (SIS)

18. Enable students to apply for admission to programs via kiosk information stations. (SIS)

19. Prepare, send, and receive student transcripts electronically. (SIS)

20. Purchase and implement a document imaging system to minimize paper records of student admission documents. (SIS)

21. Develop a system for tracking international students. (SIS)

22. Purchase equipment and develop a system for on-line registration for adult and continuing education classes at all class locations including the main campus. (ACE)

23. Install a computerized time clock for recording student hours in adult education classes. (ACE)

24. Provide monitors for video bulletin boards as an interim resource prior to installing kiosks throughout the campus. (SIS).

25. Provide electronic access to the College catalog. (SIS)

26. Provide a career information software package for the staff and student network. (SIS)

27. Provide lap-top computers with network capability for conducting College business from remote locations. (ACE)

28. Provide more telefacsimile machines accessible to student services staff. (SIS)

29. Increase the number of phone lines dedicated to teletype machines for communicating with the hearing-impaired. (SIS)

30. Provide on-line equipment to allow faculty, staff, and student access to student information in both electronic and print formats for more effective academic advising. (SIS)

31. Ensure that all current microcomputers will be accessible to the College network. (SIS)

32. Develop an enhancement for the current student records database to allow uploading of admission testing information from the COMPASS system to the IIPS software. (SIS)

33. Purchase COMPASS system workstations for student placement testing. (SIS)

34. Enhance current student records database to indicate when students have registered for courses more than the number of times allowed by College policy. (SIS)

35. Acquire a classroom scheduling software package to facilitate course scheduling. (SIS)

36. Enter part-time faculty applications into a database to be used by program directors in selecting faculty. (SIS, AAS)

37. Implement a method for budget tracking and reporting to account supervisors. (SIS, AAS)

38. Enter plans of study and other curriculum information into a database for student access and for use in developing schedules and planning budgeting needs. (SIS)

39. Maintain computer systems and information in a secure environment to be used by only knowledgeable individuals and audited on a regular basis. (SIS)

40. Improve access to the current IIPS software. (AAS, SIS)

41. Establish a second computing platform to improve access to read-only information from the IIPS software via scheduled downloading of information. (SIS, AAS)

42. Provide networked access for CD-ROM and other software formats. (AAS)

43. Install a software licensing package to track user access to the College network. (AAS)

44. Provide all employees' work schedules via the network. (AAS)

45. Provide faculty and staff access to software for word processing, database, and spread sheet applications. (AAS)

46. Connect the library card catalog and CD-ROM resources to the College network. (AAS)

47. Provide Internet access to library users via the College network. (AAS)

48. Provide library indexing access to students through kiosk information stations located throughout the College. (AAS)

49. Barcode student, faculty, and staff identification cards for accessing library materials (AAS) and for recording instructional time in adult and continuing education classes. (ACE)

50. Provide necessary student information from the IIPS software to library staff via the College network. (AAS)

51. Provide library staff access to IIPS software to hold student grades and/or transcripts of delinquent borrowers. (AAS)

52. Upgrade library microcomputers to run Windows applications. (AAS)

53. Provide read-only research information via the College network. (AAS)

54. Establish software standards for clerical personnel. (WPC)

Physical Plant. The following recommendation for the College's physical plant is based on the need for information technology to increase energy efficiency:

1. Upgrade heating and air conditioning systems to be compatible with an energy management system. (PPA)

The following recommendations address the College's need for new technology to maintain and update equipment for more effective management of resources:

1. Provide maintenance and housekeeping staff networked computers and software to facilitate scheduled maintenance of facilities. (PPA)

2. Provide software for managing key distribution. (PPA)

3. Provide access to the College network for managing maintenance and housekeeping work orders and central supply orders. (PPA)

4. Develop a plan for maintenance and upgrading of computer equipment. (AAS)

5 Consider reducing the number of copying machines maintained by outside vendors. (WPC)

6. Consider the possibility of transmission of duplicating needs via the network to machines capable of handling larger jobs. (WPC)

Training. The following recommendations for staff training were addressed by all study group reports:

1. Provide Internet training for students, faculty, and staff. (INF)

2. Train maintenance, housekeeping, and other auxiliary staff in basic computer literacy and the use of networked services. (PPA)

3. Develop user support groups with designated expert users within work groups. (AAS)

4. Conduct in-house seminars in network use and applications software. (AAS,SIS,WPC)

5. Conduct employee training in managing and using the telephone system. (TEL)

6. Provide on-going training for appropriate employees in keyboarding, database management, word processing, student records database, INFORM, electronic mail, the Internet, tracking, scheduling software, and network training for advising personnel and advisors. (SIS)

7. Provide Computer Services personnel training in using the new hardware platform and College network. (INF, AAS)

8. Train programming personnel of Computer Services in the use of client/server programming for the College network. (INF,AAS)

9. Encourage employees to take advantage of credit and non-credit courses offered by the College in the standard applications and in the programming languages of the hardware platform. (AAS,WPC)

10. Encourage employees to take advantage of workshops and seminars offered by the N.C. Department of Community Colleges. (AAS)

11. Schedule training sessions for Computer Services personnel that ensure back up personnel for each position. (AAS)

12. Develop a continuing training plan for clerical personnel. (WPC)

Staffing. The following recommendations were made to increase staff to support the information technology plan:

1. Employ an individual half-time in either Media Services or Computer Services to support a video bulletin board. (INF)

2. Employ additional data entry personnel for admissions. (SIS,AAS)

3. Employ additional student records staff to facilitate document imaging. (SIS)

4. Employ an advising assistant. (SIS)

5. Increase staff in the user services component of Computer Services. (AAS)

6. Arrange for repair of personal computers in an on-campus repair facility by hiring an individual and/or providing work experience opportunities for Digital Electronics Repair students. (AAS)

7. Employ a computer network engineer to supplement current Computer Services staff.(INF)

8. Employ a client/server programmer to supplement current Computer Services staff.(INF)

9. Employ a personal computer technician to supplement current Computer Services staff.(INF)

Expected Outcomes of the Recommendations

The recommendations of the study groups of the administrative systems planning committee and the 1994-96 goals of the College were studied to ensure College goals would be addressed by the recommendations. In consultation with the Coordinating Team of the Steering Committee, the chair and vice-chair of the ASPC developed anticipated outcomes for the recommendations of the committee.

When the Strategic Plan for Information and Communication Technology is implemented, residents in the College service area will have increased access to college

information through a more efficient telephone system, College information on the Internet, and information stations on the campuses and in the community. The following specific outcomes are anticipated as related to **College Goal 1**:

1. Within two years of the implementation of the information and communication technology plan, 100% of all incoming calls will be answered and the individuals calling the College will get information either through an automated system or by talking to a Durham Tech employee.

2. By the end of year three of the plan, 50% of students will register for classes using a telephone registration system. By the end of year four, 85% of students will use telephone registration services.

3. After the implementation of telephone registration for classes, 80% of students who register for classes via telephone registration will express satisfaction with the system.

4. At the end of year three of the plan, 75% of students who are hearing impaired will use TDD/TTY machines to communicate with instructors and staff of the College.

5. By the end of year four of the plan, 25% of students and potential students who visit the main campus will get information about Durham Tech programs, services, and activities from a computer information station and video and/or electronic bulletin boards.

Student achievement and development will be enhanced by 1) providing students with access to their own progress information via computer information stations; 2) providing faculty advisors and counselors access to information on student progress; 3) providing access to both full- and part-time faculty members, staff, and administrators through a more efficient telephone system; and 4) providing information about available services via College and community computer bulletin boards. In support of student achievement and development, the following outcomes as related to **College Goal 2** are anticipated from the implementation of the information and communications plan:

1. By the end of year one of the plan, student satisfaction with academic advising will increase by 20% as faculty and staff are trained to access student progress information. Student satisfaction with academic advising will increase significantly each year of the plan as more faculty and staff are trained to access information from the College network and databases. At least 85% of students will report being satisfied with academic advising by the end of year five of the plan.

2. By the end of year one of the plan, at least 85% of the students will report they are satisfied with their ability to reach both full- and part-time faculty and staff of the College via telephone, voice mail boxes, and electronic mail.

The College will be able to recruit and retain excellent faculty and staff when a commitment to information technology is demonstrated in administrative processes. Students of the College will have access to excellent faculty and staff and the satisfaction of faculty and staff with administrative processes will increase. The following outcomes are related to **College Goal 5**:

1. By the end of the first five years of the plan, the number of applications for faculty and staff positions advertised will increase by 50%.

2. By the end of the first five years of the plan, 50% of College faculty and staff will express greater satisfaction with College communications and day-to-day work flow.

3. By the end of year five of the plan, 80% of College employees will express satisfaction with their jobs.

The College will develop partnerships with business, industry, government, and non-profit organizations to link pertinent educational and training programs to those organizations to provide for economic growth in the College service area. Access to College information on the Internet and through other communication technologies will result in greater access to the College by external organizations. The following outcome is related to **College Goal 6**:

1. By the end of the second year, 100 businesses, industries, government agencies, and/or non-profit organizations will view an introduction to the programs and services of the College on the Internet and send electronic mail to the College to get further information.

Public schools, senior institutions, and other agencies will be linked to the College through the Internet and the College network to develop and maintain relationships that enhance opportunities for residents to continue their education. The ability to send and receive information from other educational institutions and financial aid sources will greatly enhance the ability of students to access the continuum of education. The following outcomes are related to **College Goal 7**:

1. By the end of the second year of the plan, applications by potential students from area high schools will increase by 25%.

2. By the end of the second year, students will be able to report efficient and successful transfer to and from Durham Tech using electronic transmission of transcripts.

The effective and efficient management of fiscal resources, human resources, and physical facilities necessary to support a positive learning environment for students will be enhanced with the installation of a more responsive telephone system and a more efficient administrative computing system. The College will see increased productivity in its administrative operations, with the specific outcomes related to **College Goal 9:**

1. By the end of the first five years of the plan, an analysis of administrative processes will show strategies have been implemented to increase productivity by 10%.

2. By the end of year three, 25% more students will express satisfaction with the heating, ventilation, and air conditioning systems in the teaching/learning environment of Durham Tech.

The on-going evaluation of programs and services to ensure continuous improvement in support of the institutional effectiveness program will be enhanced as 1) more

communication links are opened through the new telephone system and a College network, 2) data is more readily available to College administrators, and 3) application software is made available on the College network for data analysis. Both day-to-day decision making and on-going program evaluation will be facilitated with greater user of information technology. The following outcome is related to **College Goal 10:**

1. By the end of year three of the plan, 50% of College administrators will express satisfaction with their access to decision support software and data needed to perform analysis for management functions.

College Goal 8, to"enhance programs and services through the use of advanced information technology," was found to be the dominant focus of the information and communication technology planning efforts. All anticipated outcomes that have been identified apply to this goal. Issues of access, availability of information and data, and improved productivity addressed here will enhance the programs and services of the College.

CHAPTER 5: STRATEGIC PLAN FOR INFORMATION AND COMMUNICATION TECHNOLOGY

During the initial stage of the self-study, the Steering Committee formulated the following goals to guide its direction:

1. To improve and strengthen the institution's planning process;

2. To serve as a basis for affirming or revising the institution's mission and purpose;

3 To ensure that intended educational outcomes are enhanced through the use of appropriate information and communications technology;

4. To ensure that institutional efficiency and effectiveness are enhanced through shared resources and the use of appropriate information and communications technology;

5. To identify ways in which information and communication technology can enhance the quality of the institution's current programs, processes and operations;

6. To identify the effect of information and communications technology on the institution's future programs, processes and operations;

7. To enhance the institution's position within its service area by improving the quality of its services and the workforce preparedness of its graduates; and

8. To develop the priorities for information and communication technology for the institution over a five-year period, to develop a budget and a related resource development plan, and to present a human resource plan with staffing requirements and training.

During the fall of 1994, the Steering Committee developed a vision for the impact of information and communication technology on Durham Technical Community College. The vision statement sets the direction for the College as it implements new technology.

Vision Statement for the Information and Communication Technology Plan[1]

Durham Technical Community College is a teaching and learning organization that is committed to continuous self-evaluation and improvement. To facilitate the achievement of its mission, the College will respond to the rapid technological changes through developing and regularly updating an information and communication technology plan. The College will incorporate proven technology in the delivery of instruction and services, in the preparation and renewal of the local work force, and in its own administrative functions.

The ultimate goal is the effective use of technology to promote excellence in programs, processes, and outcomes. While technology alone cannot improve ineffective processes, the effective use of technology can significantly enhance the College's ability to deliver quality services and programs.

The College recognizes that its faculty and staff are its most valuable resources and that well-educated students are its most important outcome. Technology must serve human needs, with people choosing technology solutions that will increase their productivity, enhance learning, and improve overall quality.

Technology is a tool that is valuable only if the faculty and staff are empowered to use it. An on-going professional development program for

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[1]Adopted by the Steering Committee on October 13, 1994

faculty and staff is essential for the investment in technology to yield the maximum benefits. The College expects that the investment in technology training will result in increased productivity and job satisfaction among its faculty and staff.

For the College to benefit fully from the investment in technology, the faculty and staff must drive the planning process. Positive changes will occur as the faculty and staff identify and implement technology solutions. Technology should encourage creativity among employees, and the College will support faculty and staff experimentation with new ways of accomplishing their goals and objectives.

The technology plan is not static but constantly evolving. The College commits to updating the plan annually so that a current five-year plan is always available.

Information and Communication Technology Planning Assumptions

The Institutional Effectiveness Committee established six environmental scanning teams to review the literature and prepare a set of planning assumptions each year to guide the College as it revises its institutional effectiveness plan. The technology scanning team submitted the following set of assumptions to the Steering Committee, which adopted them at its March 3, 1995, meeting. These planning assumptions are accepted as givens and must be considered as the technology projects are approved, implemented, and evaluated.

Teaching and Learning

1. It is essential for students to be prepared to use appropriate technology in the workplace and in the universities and to develop the skills required for lifelong learning.

2. New instructional delivery strategies are needed to meet the demands of an increasingly diverse and sophisticated student population and to enhance student access by overcoming time and space limitations.

3. Through the use of technology, the College will provide equal opportunity and quality of instruction to students at all campus sites.

4. The use of technologically-advanced systems will enhance student retention and improve the quality of instruction.

5. Technology will allow the College to address the needs of students with different learning styles, varying levels of educational achievement, and physical limitations.

Information Access for Students, Faculty, and Staff

6. The tremendous increase in the amount of information available from within Durham Tech and from outside agencies via technologically advanced systems compels the College to find new ways to capture, store, and share information.

7. There is an increasing need for easier access to information and for it to be available in a variety of formats including text, graphics, and video.

8. The availability of electronic mail for all faculty and staff including personnel at off-campus sites is necessary to support internal and external communications.

9. Inter-departmental and inter-divisional collaboration and sharing of information and resources are essential components of an effective technology plan.

10. Access to external databases is critical in carrying out the mission of the institution.

Networking

11. A campus network is required to support other advances in technology.

12. A network designed with scalable architecture that can meet the needs of today and the challenges of tomorrow is essential.

13. Networking standards and procedures are necessary to insure effective operation and maintenance of the network.

14. Recognition of the diverse needs of faculty, staff, and student users and the development of a strategy for combining multi-platform and multi-vendor environments are essential.

15. Security and integrity of data are major issues as more and more users access the College's campus network.

Hardware and Software

16. Current software used in business and industry and state-of-the-art hardware are essential for instruction to prepare students for jobs and for efficient operation of the College.

17. Appropriate hardware and software standards are necessary to assure the College's ability to share information, to support technology adequately, and to operate efficiently.

18. The current administrative software is outdated and incapable of fully addressing the College's management information needs.

Faculty and Staff Professional Development

19. The College has a responsibility to provide technology training to employees.

20. Employees have a responsibility to seek diligently the new technology skills they need to perform their jobs effectively.

Organization

21. The College must be prepared to reorganize to ensure that its organizational structure allows its students and employees to derive the maximum benefits from the use of technology.

22. An environment that fosters innovative ideas in the use of technology in both the classroom and the office is necessary.

23. An expanded, customer-driven support system equipped and staffed with adequate resources is essential to the successful integration of new technology at all the College's sites.

Resource Allocation

24. The College must ensure that a priority in the allocation of information and communication technology resources is the support of the teaching and learning mission.

25. The College has a responsibility to provide flexible, high-quality student services in a cost-efficient manner.

26. The College must allocate resources in a manner designed to maximize their effectiveness.

27. A funding strategy for the shared acquisition and operation of hardware, software, and networking components is essential.

28. Adequate and specific funding for replacement and for maintenance of all educational equipment, both low- and high-tech, is necessary.

29. New partnerships or alliances with industry are needed to help meet the costs of technology.

30. The College has a responsibility to provide adequate resources to ensure the implementation of the technology plan.

Strategic Priorities for the Information and Communication Technology Plan

Recommendations from the two principal committees provided the basis for the strategic plan. The Coordinating Team, consisting of the chairs and vice chairs of the Administrative Systems Planning Committee, the Instructional Technologies Planning Committee, and the Steering Committee, reviewed the recommendations, debated their relative merits, determined the most important recommendations, and ordered them

sequentially. Foremost in these considerations was the feasibility of implementing the recommendations.

After extended deliberations and revisions, the Coordinating Team submitted a draft five-year plan for the Advisory Committee and full Steering Committee to review and critique. The initial five-year plan approached an operational plan, with specified activities and associated time lines and responsibility for implementing each activity assigned. The Advisory Committee urged that the report be organized around the most critical initiatives: a new telephone system to improve voice communications; a campus network to provide the physical infrastructure necessary to support future initiatives, including the Internet connection and internal communications and data access; an upgraded administrative computing system which runs on a UNIX platform and has software enhancements suited to the campus needs; and personal computers, available to students in open laboratories and faculty and staff on their desks, to give faculty, staff and students easy access to the computer resources.

The influx of computer technology creates associated support issues. The Advisory Committee has repeatedly emphasized the human resources needed for implementing the plan. One concern is the ability of the computer support staff to support users in implementing the technology. A plan to empower users through training is critical. Thus, user groups are a major focus in the ongoing training plan. The "super user" group will serve as in-house trainers to provide support to employees in their departments or programs. These super users will also serve as liaisons with Computer Services staff in communicating user needs and

initiating activities to support users. Thus, training is an important component of the plan for each initiative.

The Advisory Committee also urged that the plan address maintenance issues associated with the increase in technology. A reasonable estimate is that 10% of the initial cost of the equipment will be spent annually on maintaining it. The College must prepare for the ongoing operational costs associated with maintaining the technology. With a goal of achieving some degree of standardization on the hardware, the Advisory Committee proposed that an in-house repair shop be established to offset some of the costs of maintenance contracts.

The Steering Committee considered the Advisory Committee's recommendations and established the following three priorities for the five-year information and communication technology plan: the campus network; instructional technologies, including library resources, open computer laboratories, multimedia and computer-assisted instruction, and faculty access to personal computers; and administrative systems and applications, including the telephone system. The full committee developed the rationale for these three priorities as summarized in the following sections.

For implementation purposes, the Steering Committee adopted an operational plan which describes the expected activities, year by year, for each of the three initiatives. The following four categories of costs are included for each initiative: (1) capital outlay, services, and supplies; (2) training; (3) new positions; and (4) operational costs, including maintenance, fees, etc. A spreadsheet summarizes the costs over the five years for each initiative and for each category.

The Steering Committee has also adopted computer hardware and software standards for the College. The Computer Hardware and Software Standards Committee, representing the major areas of the College, continues to review and periodically update the approved list of hardware and software. The hardware standards should be used in purchasing new equipment to ensure compatibility with the network and the ability to accommodate the standard software packages. The software standards are primarily for administrative use, including faculty preparation of instructional documents, like course outlines, syllabi, tests, etc., since academic programs will evaluate and adopt instructional software to support their course objectives. The College will provide training and ongoing support, including a help desk, only for the standard software packages. If faculty and staff purchase other software, then they must be prepared to assume full responsibility for training and support.

The Steering Committee has also addressed the issue of replacing equipment and accepting donated equipment. Given the rapid rate of technological change, the College should be prepared to upgrade computer equipment every three to five years. The goal is to have the most up-to-date computers in the most highly technologically advanced programs. As the computers in these instructional laboratories are replaced, the old equipment may still be used by faculty, staff, and students for such limited applications as word processing. The Steering Committee agreed, however, that standards for hardware should be established and adhered to in order to avoid difficulties with repairs and the campus network. Before the College accepts used equipment from donors, the computer hardware should meet the College's standards, based on an evaluation of the equipment, and a user must be identified.

Otherwise, the College will be obligated to store the equipment for one year before it can be surplused.

The Director, Resource Development, drafted a procedure which was reviewed and adopted by the Steering Committee at its February 7 meeting. The following is the procedure for accepting donated computer equipment:

> The Director, Resource Development along with the Computer Hardware and Software Standards Committee will determine if the equipment meets the adopted hardware and software standards of the College's Information and Communication Technology Plan. Only if these standards are met will the equipment be accepted by the College. Distribution and utilization of computer equipment will be determined by the Executive Council based on a prioritized needs list. In the past, donors have sometimes stipulated what program or division should receive the gift. Now in order to adhere to prioritized needs, the Executive Council retains the right to make the final decision on accepting in-kind computer equipment and to determine its utilization.

The Steering Committee proposes that a resource development team, reporting to the Director, Resource Development, study the resource needs and develop a plan for securing resources to support the technology plan. Presidential support in resource development is recognized as essential. Finally the Steering Committee recommends that the Executive Council and president consider the organizational structure, including committees and work

teams, needed to support implementation of the technology plan. An implementation plan is included as the final section of the College's strategic plan.

Campus Network. A campus network has the potential of addressing many of the goals of the self-study through enhancing communication and instruction, improving access to data, increasing productivity through the use of applications software, and sharing of resources through metered software.

The primary mission of the College is teaching a highly diverse student population ranging from recent high school graduates through those of retirement age. Teaching strategies which incorporate multimedia and other computer-assisted instruction offer alternatives to the traditional lecture-discussion method and may be more appropriate for the College's student population. The proposed wiring plan will connect each classroom to the network which will have video, voice, and data capabilities. The possibilities for teaching and learning are endless with materials now available on CD-ROM and with faculty developing their own multimedia presentations. Because the majority of Durham Tech's students work and attend college part-time, the students will benefit greatly from accessing the network from their home personal computers or from campus computer laboratories open every weekday from 8:00 a.m. until 10:00 p.m., with shorter hours on weekends. Students could communicate with faculty via electronic mail, receiving comments from faculty on written work they submit over the network. Students could also review classroom materials faculty make available over the network. In some classes, the majority of instruction could occur over the network, with face-to-face meetings used for tutorials and for testing as necessary.

Institutional planning will be improved through a campus network. Administrators and faculty could access data extracted and stored on a file server. The fact book, College policies and procedures, institutional effectiveness plan, and evaluation results--all useful in planning--could be stored and accessed electronically by all offices. Furthermore, the electronic transfer of documents, such as the institutional effectiveness plans and reports, budget requests, and job descriptions, would assist in the compilation of plans. Using consistent information stored on the file server will reduce concerns about the accuracy of data and improve planning activities.

Review and revision of the College's mission and goals are ongoing processes integrated with the overall planning processes. Goal setting must be preceded by an evaluation of past performance and an awareness of environmental factors that affect the College. Currently six environmental scanning teams review pertinent external information and develop planning assumptions for the College's use in developing institutional and unit-level goals. Critical information, such as employment outlooks, population statistics, and projections of high school graduates, could be made available over the network, especially through the Internet connection. Access to critical data available over the wide-area network should improve the planning process.

Sharing the College's limited resources is another goal of the technology plan. With a network, software will be loaded on file servers and site licenses will allow for a limited number of persons to access the software at one time. Rather than having to purchase software for **all** machines in **all** the labs and offices, the College will have site licenses for 50 or 100 users. Once the limit is reached, then the next user simply receives a message

indicating that he/she will have to wait until someone else exits the software. The College should save on software purchases through the metered approach.

The College is selecting standard software packages to make available over the network. Support through training and help desk personnel will be available for these packages. As faculty and staff purchase computer hardware, they will be expected to demonstrate competencies in using the software. A variety of training approaches, such as classroom instruction, short workshops, self-paced learning packages, and user groups, will provide faculty and staff the opportunity to gain those competencies. With the training and the availability of software over the network, faculty and staff will increase their productivity. No longer will faculty depend on Word Processing personnel to type syllabi, course outlines, and tests. They can prepare their own materials, refining their rough drafts on their computers and foregoing the editing and revision process necessary when others type their work. Staff will also be expected to use common software for their word processing, for preparing spreadsheets, and for analyzing data. Common software packages will encourage faculty and staff to share documents, thereby improving efficiency in producing institutional effectiveness reports, budget requests, etc. E-mail software will reduce paperwork, and scheduling software will facilitate setting up meetings without numerous phone calls. Electronic transmission and approval of purchase requisitions, travel requests, and other forms will eliminate paperwork and speed up processes. Tracking requests will also be possible so that the documents will no longer be "lost" on some busy administrator's desk.

Most modern offices are networked. To prepare our students for today's workplace, we must assist them in learning how to work in a networked environment. Employer

expectations include the ability to transfer documents electronically and to access information over networks, including the Internet. Students in Business Computer Programming, Office Technologies, Microcomputer Systems Technologies, Paralegal, Accounting, and Business Administration must be capable of working in networked office settings.

The network will offer a host of new possibilities for teaching, learning, and working. Students can have more control over their learning as they navigate through material at their own rates, accessing video and reading text as needed. Teacher-controlled classrooms will be replaced with student-centered instruction as students use computers either in their homes or in open labs. Distance learning, with faculty located at remote sites from their students, will be possible. Faculty and staff can engage in video conferences and other professional development activities offered over the wide-area network. Staff may telecommute, using computers at home to do their work. The College can advertise programs and services on its own home page over the Internet. Class schedules, extra-curricular offerings, and other information can be made available to a wide audience with access to the Internet. Other network uses include advising students and registering students for classes.

All of these activities require the College to have a campus network which is then connected to the wide-area network via the Internet. Enhancements in productivity and improvements in teaching and learning are only beginning to be imagined. New and unanticipated applications will emerge after the network is in place. The College must be prepared to use the applications through establishing the network as soon as possible.

CAMPUS NETWORK

YEAR 1--CAPITAL OUTLAY, SERVICES, AND SUPPLIES	
Install the basic network by running fiber backbones in each of the five buildings on main campus, installing fiber between the buildings, and installing the hardware in wiring closets	$145,000
Purchase network tools and other miscellaneous supplies	$9,100
Provide network connections to the desktops in selected offices in White and Adult and Continuing Education (ACE) buildings	$15,000
Provide electronic mail and campus information to employees over the network	$1,700
Purchase software and/or licenses for users in White and ACE buildings including latest version of DOS and Windows, WIntegrate, ProComm, etc.	$19,700
Upgrade the Computer Services file server to serve the campus	$15,000
Install a CD ROM tower and fax card on the campus network	$3,000
Provide a workstation and printer, connected to the network, for academic advising	$2,400
Establish policies and procedures for Internet access, accounts, and security	$0
Install Internet server with a UPS and associated hardware	$18,000
Provide 10 telephone lines for dial-in access to the Internet (NSF Grant)	$0
TOTAL YEAR 1: Capital outlay, services, and supplies	**$228,900**
YEAR 1--TRAINING	
Provide Internet connectivity and TCP/IP training for two Computer Services (CS) staff	$2,000
Provide Synoptics 5000 connectivity training for one CS staff member	$1,900
Provide Cisco router training for one CS staff	$900
Provide Novell systems administration training for one CS staff	$1,800
Establish a network users group to support each other and to provide feedback to the network administrator	$0
Train 60 faculty and staff on access and use of the campus network and e-mail	$0
Establish an Internet users' group to support new users and train 20 employees	$0
TOTAL YEAR 1: Training	**$6,600**
YEAR 1--ADDITIONAL STAFF POSITIONS	
Network Engineer	$35,000
TOTAL YEAR 1: New or reallocated positions	**$35,000**
YEAR 1--OPERATIONAL COSTS	
TOTAL (First year under one-year warranty)	**$0**

YEAR 2--CAPITAL OUTLAY, SERVICES, AND SUPPLIES	
Install the basic network across Lawson Street to the Basic Skills Center (BSC) and Newton Building	$74,981
Provide network connections to the desktops in Phillips, Collins, ERC, BSC, Technology Center and Newton buildings. (includes supplies and materials)	$124,136
Provide mail and campus information to College employees over the network	$2,610
Add users to the software licenses and upgrade versions of software	$19,700
Install a Novell server at NDC to provide network services to all employees	$15,000
Connect faculty and staff to the internal network at NDC and lease ISDN lines to connect to campus network	$5,500
Miscellaneous supplies	$3,500
TOTAL YEAR 2: Capital outlay, services, and supplies	**$245,427**
YEAR 2--TRAINING	
Provide additional network training for two CS staff	$2,000
Train 40 faculty/staff on the Internet; continue Internet users' group	$0
Train 60 faculty/staff on access and use of the campus network and e-mail	$0
Continue network users' group	$0
TOTAL YEAR 2: Training	**$2,000**
YEAR 2--STAFF POSITIONS	
Continue Network Engineer	$35,000
TOTAL YEAR 2: New or reallocated positions	**$35,000**
YEAR 2--OPERATIONAL COSTS (MAINTENANCE, FEES, ETC.)	
Maintenance on six (6) Novell servers	$6,000
Maintenance on video bulletin board software	$250
Maintenance on network hardware	$9,052
Lease ten (10) telephone lines for dial-in access to network	$1,700
NCIC annual fee for Internet connection through MCNC	$2,000
Maintenance on Internet server and router	$1,800
T1 connection to MCNC	$8,379
TOTAL YEAR 2: Operational costs	**$29,181**

Instructional Technologies. The primary goal of the College's technology initiative is to enhance teaching and learning and to expand educational opportunities to under-served populations. Distance learning applications will allow students to receive instruction in their homes or in other remote sites. Instructional technologies offer new modes of delivering information that are alternatives to the traditional lecture and discussion methods. These new modes will transform the roles of teacher and learner: the teacher will become a facilitator of learning and a developer of instructional materials; and the student will be transformed from a passive recipient of information to an active participant in the teaching/learning process.

Underlying the technology strategic plan is the College's continuing commitment to quality in education. Enhancements resulting from this initiative will support the delivery of instruction and assist instructors through the following:

Providing more informational resources in different forms of media to faculty members;

Providing timely and up-to-date information within specific subject areas;

Enabling instructors to move from theory to application within a classroom meeting;

Relieving faculty members of relative nonproductive, tedious reporting tasks;

Providing convenient access to needed information so that faculty can dedicate more time to the teaching process;

Contributing significantly to faculty morale and faculty development by providing opportunities to expand their knowledge base; and

Linking instructors to colleagues on the College's campus and around the world.

Students will benefit through these initiatives by the following:

Leaving Durham Tech as individuals who are better equipped to thrive in a dynamic, technological society;

Shifting from a memorization mode of learning to one of understanding, applying, and investigating for continuous learning;

Learning how to access information quickly on their own from a variety of resources;

Being able to progress at their own pace using learning modes which meet their individual needs;

Retaining information presented by multimedia, multi-sensory technology;

Developing an attitude of commitment to life-long learning;

Becoming familiar with the tools of the modern workplace; and

Understanding that learning is a process rather than a product.

Specifically, computer applications must be made available to support **all** instructional areas. As all classrooms are connected to the campus and wide-area network, faculty will use portable hardware to access information in all modes, including voice, video, and data. Open computer laboratories will provide students with the opportunities to use applications software, to access information centrally housed, and to move to the wide-area network for accessing resources remote from the College. Open computer laboratories will become less important as it becomes possible to deliver instruction to every desktop in every office, classroom, and home with access to the campus network. Distance learning classrooms will enable audiences at off-site locations to experience live instruction via the North Carolina Information Highway or wireless technologies. Combining instructional sites will permit the College to offer courses to populations that otherwise might not be served and to achieve cost savings through reduced expenditures for instruction. The Internet will provide another

alternative method for delivering instruction and for students to send and receive class assignments.

Clearly the emerging technologies have profound implications for both the College's content of instruction and its delivery methods. The effective use of technology to enhance teaching and learning is dependent upon faculty learning to use the technologies. Therefore, training and professional development must be major and on-going component of the technology plan.

INSTRUCTIONAL TECHNOLOGIES

YEAR 1--CAPITAL OUTLAY, SERVICES, AND SUPPLIES	
Establish a multimedia development lab	$19,000
Develop a distance learning plan incorporating Internet, the North Carolina Information Highway (NCIH), wireless communication, etc.	$0
Enhance the Campus Learning Center by adding 10 PCs, a UPS, and one printer file server	$30,000
Replace 63 White with 21 new computers	$52,500
Replace 70C White with 21 new computers	$52,500
Add 10 MacIntoshes to 363 Phillips	$25,000
Add five workstations to 419 Newton	$25,000
Equip Novell training room in Newton	$50,000
TOTAL YEAR 1: Capital outlay, services, and supplies	**$254,000**
YEAR 1--TRAINING	
Hold a technology fair on campus	$300
Provide multimedia training for five faculty members	$2,250
Establish multimedia mentor program to train faculty and provide release time for faculty mentors (two courses per quarter)	$8,000
TOTAL YEAR 1: Training	**$10,550**
YEAR 1--STAFF POSITIONS	
Computer Technician (half-time)	$8,640
Lab Monitors (78 hrs. per week, 44 weeks)	$24,024
Coordinator, Instructional Computing (half-time)	$20,000
TOTAL YEAR 1: New or reallocated staff positions	**$52,664**
YEAR 1--OPERATIONAL COSTS (MAINTENANCE, FEES, ETC.)TOTAL YEAR 1:	
Operational costs	**$0**
(Assume all new purchases have one-year warranty.)	
YEAR 2--CAPITAL OUTLAY, SERVICES, AND SUPPLIES	
Purchase network software for faculty to manage grades	$5,000
Implement the distance learning plan with video at NDC, Orange High School, Chapel Hill High School	$40,000
Provide one mobile multimedia unit for faculty use in classrooms	$9,000
Install a fully integrated automated library system	$43,685
Install computer lab in Basic Skills Center (25 PCs)	$66,500
Add 15 PCs to Campus Learning Center	$37,500
Replace 357 Phillips with 20 new PCs	$50,000
Replace 108 NDC with 15 PCs	$37,500
TOTAL YEAR 2: Capital outlay, services, and supplies	**$289,185**

YEAR 2--TRAINING	
Hold a technology fair on campus	$300
Provide multimedia training for five faculty members	$2,250
Establish multimedia mentor program to train faculty and provide release time for faculty mentors (two courses per quarter)	$8,000
Train ERC staff on automated library system	$1,500
TOTAL YEAR 2: Training	**$12,050**
YEAR 2--STAFF POSITIONS	
Continue Computer Technician (half-time)	$8,640
Continue Lab Monitors (78 hrs. per week, 44 weeks)	$24,024
Continue Coordinator, Instructional Computing (half-time)	$20,000
YEAR 2: New or reallocated staff positions	**$52,664**
YEAR 2--OPERATIONAL COSTS (MAINTENANCE, FEES, ETC.)(Assume all new purchases have one-year warranty.)	
Maintenance on year 1 purchases--10% of cost	$25,400
Maintenance on automated library system	$1,800
YEAR 2: Operational costs	**$27,200**

Administrative Systems and Applications. Durham Technical Community College has numerous inefficiencies in its administrative processes and operations which can be addressed through the appropriate use of information technology and communications. Employees enter and maintain data on separate systems, sometimes not accessible to other offices with personnel needing the data. The same data may be entered by several individuals into different databases serving different needs. The inflexibility of the current administrative software, developed and maintained by the Department of Community Colleges (DCC), leads to the creation of multiple databases, often maintained on in-house personal computers. Furthermore, all individuals who need access to data are not connected to the administrative network. One major goal for the College is to enhance the current administrative software to serve better the needs of all personnel, whether this enhancement is through modifying the existing software, working with DCC to improve existing software for all community colleges, purchasing administrative software more appropriate for meeting the College's needs, or developing in-house administrative software. A truly relational database should provide the type of administrative system needed by College personnel. Redundant data files should be eliminated through developing appropriate systems and through general access to centrally maintained data. Sharing data on centrally maintained files is critical to improve efficiency of administrative operations. The College should move toward a client-server approach, with users retrieving centrally stored and maintained data to import into PC-based application programs.

The vision for the new administrative computer system requires a campus network with connections to all faculty and staff offices and to information kiosks conveniently located

for student use. Increased access to the administrative system must be an outcome of the technology plan. Because the current administrative computer, a Prime 4150, is running at maximum capacity and performance problems are common, adding new users and applications to the system is not feasible. Registration and payroll functions are given top priority for computer resources from a practical necessity, and these functions consume most of the current resources. Therefore, alternatives that allow faculty access to student information necessary for advising students and for providing students access to their records must be developed. Replacing the current system with a larger and faster processor is a top priority. In addition, the College should store data on a large server for "read only" access to accommodate the needs of faculty and students. Data warehousing should also be explored for storing critical data needed for informing management decisions.

A major need not currently met through the existing administrative system concerns student advising. Academic advisors and students now have difficulty retrieving information about student progress toward completion of programs and plans of study. Few offices have access to up-to-date records. Thus, faculty are frequently asked to provide academic advising without having the students' records. Providing faculty advisors and students with direct access to student information can assist students in making better course decisions. Timely and good advising is an expected outcome of the enhanced administrative system which will provide new and better ways of providing current student information to appropriate individuals.

Communication emerged as a major problem for the College. The eleven-year old PBX telephone system cannot accommodate voice mail and automated attendant functions.

A telephone traffic analysis revealed that 12% of the incoming calls to the College are not answered before the callers disconnect. Thus, the College is often unable to meet the needs of its clients through providing critical information. Students are unable to reach faculty or leave messages. Telephone tag reduces the productivity of employees as they attempt to schedule meetings and conduct other business that could be handled easily through voice mail or e-mail systems. Thus, replacing the current telephone system with CentraNet is a priority for 1995-96. The effect of an automated attendant will be to reduce the number of calls handled by the operator so that she can answer all incoming calls needing personal assistance. Voice mail will allow messages to be left to established groups or to individuals. Students and prospective students will have more access to faculty, particularly part-time faculty, through voice mail boxes.

E-mail, video bulletin boards, and a home page on the Internet will enhance communications even further. One of the first applications to be available on the campus network will be an e-mail system with scheduling capabilities. Time spent setting up meetings and identifying available facilities will be reduced through e-mail software. The video bulletin board will provide a calendar of campus events to be viewed on monitors mounted centrally in each campus building for students, faculty, staff, and visitors to read. Once the campus is an Internet node, then the World Wide Web can be used to set up a home page with marketing information about the College available to anyone in the world with Internet access. Potential uses for this Internet home page will include advertising open employment positions, communicating the up-coming class schedule, listing all programs and courses

offered, and providing essential facts about the College to individuals interested in attending or in working at Durham Technical Community College.

Thus, the quality of administrative operations and services will improve with a new telephone system, a larger and more powerful administrative computer, a server to store critical data for individuals who need "read only" access, enhanced administrative software and applications including e-mail, and a video bulletin board to reach every campus facility.

ADMINISTRATIVE SYSTEMS AND APPLICATIONS

YEAR 1--CAPITAL OUTLAY, SERVICES, AND SUPPLIES	
Install CentraNet on campus	$10,500
Purchase new telephones	$5,116
Establish a computer connection to NDC via ISDN line (hardware costs only)	$7,200
Purchase UNIX computer and convert from Prime to UNIX by summer 1996	$89,000
Install two terminal servers to accommodate existing "dumb" terminals	$3,200
Purchase and add 17 PCs in White and ACE buildings	$42,000
Connect existing PCs to the network in White and ACE buildings	$6,000
Purchase and install a Barcode creator and reader hardware and software for security and the library for use as a stand-alone system	$10,495
Provide campus information through a video bulletin board with monitors in all buildings, including the Northern Durham Center (NDC) and Small Business Center	$6,400
Provide on-line registration to off-campus sites through the use of laptop computers and modems.	$7,500
TOTAL YEAR 1: Capital Outlay, services, and supplies	**$187,411**
YEAR 1--TRAINING	
Provide computer literacy training for faculty and staff, including standard software packages.	$2,000
Select and train a "super user" in each work area to serve as a resource for co-workers and as a liaison with CS.	$0
Train CS staff member on UNIX operating system.	$0
Train two CS staff members on Sun system.	$3,400
Train one CS staff in fire walls and security of administrative system.	$1,200
Train one staff to use barcoding and to serve as trainer on campus.	$600
Train CS staff on project management and systems analysis.	$0
TOTAL YEAR 1--Training	**$7,200**
YEAR 1--STAFF POSITIONS	
Telephone System Coordinator (reallocate position)	$12,000
UNIX System Administrator/Operator (reallocation of existing positions)	$25,000
TOTAL YEAR 1: New or reallocated staff positions	**$37,000**
YEAR 1--OPERATIONAL COSTS (MAINTENANCE, FEES, ETC.)	
ISDN lines NDC and Small Business Center	$1,200
CentraNet--leased telephone services	$99,000
Maintenance on video bulletin board software	$250
TOTAL YEAR 1: Operational costs	**$100,450**

YEAR 2--CAPITAL OUTLAY, SERVICES, AND SUPPLIES	
Implement the telephone registration system with voice response unit	$28,855
Study the adequacy of the IIPS software for the campus. Identify specific needs of Business , Registration/Records, and Human Resource departments Examine alternatives and develop recommendations	$0
Install a second UNIX machine for read-only access and to serve as a back-up for the larger machine in cases of emergency	$39,000
Purchase 50 PCs for faculty and staff use	$125,000
TOTAL YEAR 2: Capital outlay, services, and supplies	**$192,855**
YEAR 2--TRAINING	
Provide computer literacy training for 100 faculty and staff, including training in standard software packages	$0
Continue "super user" program	$0
Continue UNIX training for CS staff as needed	$0
Train one CS staff in Help Desk management	$0
Train staff on telephone registration system	$750
Train CS staff in applications programming to support telephone registration.	$2,400
TOTAL YEAR 2: Training	**$3,150**
YEAR 2-- STAFF POSITIONS	
Continue Telephone System Coordinator (reallocate position)	$12,000
Continue UNIX System Administrator/Operator (reallocation of existing positions)	$25,000
Help Desk Technical Support	$14,400
Client-Server Programmer	$25,000
TOTAL YEAR 2: New or reallocated staff positions	**$76,400**
YEAR 2--OPERATIONAL COSTS (MAINTENANCE, FEES, ETC.)	
Maintenance on year 1 PCs (10% of cost)	$4,200
ISDN lines NDC and Small Business Center	$1,200
CentraNet--leased telephone services	$99,000
Maintenance on video bulletin board software	$250
Maintenance on UNIX hardware and software	$15,000
Maintenance on telephone registration system	$1,750
TOTAL YEAR 2: Operational costs	**$121,400**

ESTIMATED COSTS OF IMPLEMENTATION OF THE TECHNOLOGY PLAN

	Year 1	Year 2	Year 3	Year 4	Year 5	Totals
Campus Network						
Capital Outlay, Services, & Supplies	$228,900	$245,427	$46,600	$61,500	$3,500	$585,927
Training	$6,600	$2,000	$1,500	$1,500	$1,500	$13,100
Staff Positions	$35,000	$35,000	$35,000	$35,000	$35,000	$175,000
Operational Costs	$0	$29,181	$62,774	$57,838	$57,838	$207,631
SUBTOTAL	$270,500	$311,608	$145,874	$155,838	$97,838	$981,658
Instructional Technology						
Capital Outlay, Services, & Supplies	$254,000	$304,185	$508,150	$315,020	$245,000	$1,626,355
Training	$10,550	$12,050	$19,700	$18,300	$11,500	$72,100
Staff Positions	$52,664	$52,664	$62,750	$86,864	$86,864	$341,806
Operational Costs	$0	$27,200	$48,750	$142,565	$174,067	$392,582
SUBTOTAL	$317,214	$396,099	$639,350	$562,749	$517,431	$2,432,843
Administrative Systems and Applications						
Capital Outlay, Services, & Supplies	$187,411	$192,855	$118,300	$160,500	$90,000	$749,066
Training	$7,200	$3,150	$0	$0	$0	$10,350
Staff Positions	$37,000	$76,400	$76,400	$76,400	$76,400	$342,600
Operational Costs	$100,450	$121,400	$138,796	$150,296	$162,796	$673,738
SUBTOTAL	$332,061	$393,805	$333,496	$387,196	$329,196	$1,775,754
Totals						
Capital Outlay, Services, & Supplies	$670,311	$742,467	$673,050	$537,020	$338,500	$2,961,348
Training	$24,350	$17,200	$21,200	$19,800	$13,000	$95,550
Staff Positions	$124,664	$164,064	$174,150	$198,264	$198,264	$859,406
Operational Costs	$100,450	$177,781	$250,320	$350,699	$394,701	$1,273,951
GRAND TOTAL	**$919,775**	**$1,101,512**	**$1,118,720**	**$1,105,783**	**$944,465**	**$5,190,255**

CHAPTER 6: IMPLEMENTING THE INFORMATION AND COMMUNICATION TECHNOLOGY PLAN

To implement the five-year plan, Durham Technical Community College must develop a comprehensive strategy for locating the necessary additional funds. Full implementation includes not only resources to purchase the hardware and software and upgrade the facilities but also the allocation of staff positions, a well-coordinated training program for faculty and staff, an incentive structure to encourage faculty and staff to use the technology to its full capacity, and an organizational structure and processes to put the plan into action and to ensure continuous review and revision of the five-year plan. Some of the successes of the strategic planning process will be continued through institutionalizing committees and activities. Some of the less than successful efforts have taught campus leaders lessons to apply as the College organizes for implementing and continuing the strategic planning process.

The planning process has exemplified how valuable an external advisory group can be in a large undertaking. Continuing the efforts of the Advisory Committee will ensure an outside critique of implementation strategies and the plan update.

Faculty and staff have a wealth of ideas, enthusiasm, and energy because the project has the potential to benefit their programs directly. Their commitment and motivation must be sustained for implementing the projects and continuing the strategic planning process.

The cross-divisional/departmental study groups were quite effective in identifying needs and solutions. Teamwork will continue to be critical in the implementation phase, and

users of technology will play major roles in both the planning and implementation phases. Involving stakeholders increases the likelihood that the technology will have the desired impact and be fully implemented as designed.

A high-level committee to coordinate activities serves to ensure that an individual or a department/program cannot derail the project. Furthermore, with the Steering Committee using a consensus approach to decision-making, broad support of the plan is ensured. Visible evidence of support from the president gave further credence to the process and to the outcome. Continued support from the president, the Board of Trustees, and Executive Council will be critical for the viability of the strategic planning process and full implementation of the technology projects.

On the less positive side, the need for training faculty and staff to be good team members and leaders became evident during the process. Some study groups functioned effectively, while others floundered. The resulting reports from study groups vary in quality, in part depending on the strength of the chair and the ability of members to work as a team. Because the College cannot assume that all employees know how to be team members, adequate training must be provided prior to assigning tasks to teams.

The existing Computer Services staff and operations must be enhanced to implement the information and communication technology plan. Not only will more advanced training be required but additional staff will be necessary to support the network. Furthermore, the proliferation of desktop computers and peripherals will require additional support. Present staff has not been able to support existing technology at the level faculty and staff desire;

therefore, without further training and additional staff, implementing the plan will be less than successful.

Successes in the short run are essential to motivate and encourage faculty and staff throughout plan implementation. Without visible and continuing evidence that the plan is working, faculty and staff may become quickly discouraged.

The following implementation plan takes into account the strengths and weaknesses noted.

Resources

The three sources of funding to support the plan are state dollars for equipment, supplies, and personnel; county dollars provided by the Durham County Commissioners to support the physical plant and its maintenance and operations; and external grants and donations.

The Board of Trustees is responsible for approving allocations of state and county funds to implement the information and communication technology plan. Annually the president recommends a budget to the Board of Trustees for its adoption. The president allocates funding to the departments and divisions based on budget requests and hearings.

The director, Computer Services, prepared a budget request to support the campus network and administrative computing system and presented it to the president during the 1995-96 budget hearings. For the first time in the College's history, a separate budget to support general campus computing will be established. Funds to meet these needs are the regularly allocated state equipment and other cost funds. County funds will fund part of the campus wiring project.

The vice president/executive dean reviewed the program director's requests in light of the technology plan and recommended to the president upgrading computer hardware and software and/or adding new computers. Allocations to academic programs for computer hardware and software are based, in large part, on the technology plan. Information technology which is supported by the technology plan and which is requested by department and program directors for their units will be given high priority for funding.

The Executive Council held a retreat on July 14, 1995, for an in-depth review of the proposed implementation plan. The council agreed to implementing certain projects during the 1995-96 academic year with an understanding that resources would be committed. During another retreat the Executive Council discussed the addition of new positions and reached consensus that the College must fund a networking engineer, a coordinator of instructional computing (half-time Computer Services and half-time teaching position), a systems administrator/operator, and a part-time help desk position. Consequently, the president approved from state funds one new full-time position, one reallocation of a position (systems administrator/operator), and two half-time positions (coordinator of instructional computing and help desk staff) for Computer Services.

State and discretionary funds were identified for supporting faculty and staff training. This necessary training will be discussed in greater detail in the next section.

County funds have been allocated to support operational costs associated with implementing the new telephone system. CentraNet service requires a minimal investment of equipment funds, while the monthly operational costs will be ongoing but predictable.

The College has requested "pay-as-you-go" funds from Durham County to support purchasing and installing fiber and copper for the campus network. The County Manager has recommended to the Durham County Commissioners that Durham Technical Community College receive $120,000 in 1995-96 and $239,117 in 1996-97 for wiring the campus.

At the direction of the Board of Directors of Durham Technical Community College Foundation, Capital Consortium, Inc., was retained to conduct a study and to prepare a plan for future fundraising initiatives. The plan, presented to the Board of Directors on May 9, 1995, recommends that a capital campaign be conducted to address funding needs associated with the information and communication technology plan. The president and the director, Resource Development, will work with the Board of Directors in this effort.

The coordinator, External Grants, has developed a list of private foundations that may fund components of the information and communication technology plan. He has written a concise two-page prospectus describing the major objectives and outcomes of the plan. He and the director, Resource Development will coordinate their efforts with the president in contacting companies and private foundations to seek support of small projects such as establishing a multimedia development center.

Billie Sessoms, an instructor who chaired the Infrastructure/Internal Communication Study Group, worked with MCNC in including Durham Technical Community College in a grant application to the National Science Foundation (NSF). The grant was approved and will provide some funding to support the establishment of the College as an Internet node. The College will provide substantial support of this project from state equipment and county operational funds.

The outlook for funding the first two years of the plan is very positive, pending approval of the county funds by the Durham County Commissioners. However, external funds through grants and contributions will be necessary to support components of the plan; the College must begin organizing for a full-fledged capital campaign.

Training

The president appointed a subcommittee of the Professional Development Committee to develop campus-wide training programs. Specifically, the subcommittee has responsibility for "identifying training needs and scheduling campus-wide technology training for employees." The committee has been meeting regularly since its appointment in the summer of 1995 and has determined that during the first year, courses on the following topics will be available to all full-time and continuing part-time employees free of charge:

PC Fundamentals

How to Use Windows

Introduction to WordPerfect

The Internet as a Library Tool

Ultimately responsibility for identifying the computer competencies and skills required in each position resides with the supervisor. Job descriptions must be modified to include essential computer skills, and supervisors will use the Performance Review and Evaluation process to develop professional development plans so that employees can acquire required computer skills.

The College-sponsored training programs should address the general computer competencies common to many jobs. For example, faculty and staff will be expected to take

courses in the standard software packages made available over the campus network. The subcommittee, with input from other sources, will identify general competencies and will design training programs to ensure that faculty and staff master those competencies. Each training program should have learning objectives and should assess the employee's performance with satisfactory completion certifying that employees have mastered identified competencies.

A method of tracking which computer skills and competencies are required for the job, along with the competencies mastered by the employee in the job, will be necessary. The second Professional Development subcommittee has been charged with "developing a standardized process of documenting all professional development activities in employee's PR&E reviews and permanent employee files."

In addition, this second subcommittee will work with the Instructional Development Committee to identify general faculty development needs in the area of instructional strategies, including the use of technology. The subcommittee will also review individual travel requests, including return-to-industry proposals, which may address a need for more advanced technology training not required by the campus as a whole. For example, the Computer Services staff may need to take advanced courses in networking, and the director will write proposals seeking funding for such training.

In addition, the director, Resource Development, will approach area businesses offering computer and technology training about assisting Durham Tech by allowing employees to take courses free or at reduced rates.

The College is adopting a recommendation from the Classroom Technologies study group which called for training of a small faculty group who then become internal faculty trainers. The training plan calls for sending five faculty each year to the Institute on Academic Technology to be trained in multimedia and other advanced instructional technologies. The faculty will return to campus and train other faculty. One faculty member each quarter, who has previously received advanced training, will be released from some teaching responsibilities and will staff the instructional development center. In this role, the faculty member will assist others in using technology to develop instructional materials.

The same approach is proposed for administrative staff. Every department will designate one or more employees (depending on the size of the department) to be a "super user." In this role, the super user will be trained in how to use the campus network and the administrative computing system. The super user will assist others in his/her department in learning new skills. Furthermore, super users will serve as liaisons between the Department of Computer Services and their departments.

Staffing and Organization

The president will appoint a standing committee to continue the planning for and implementation of the information and communication technology. The Computing and Information Technology Planning Committee will have broad representation of faculty, staff, and students. *Ex officio* voting members will be the dean, Institutional Research and Information Resources, who also serves as chair; director, Computer Services; the business manager; director, Admissions and Registration; and the coordinator, Instructional Computing. Other members with three-year rotating terms will be three to five faculty, one

staff from Student Services, and one staff from Adult and Continuing Education departments. Each year the Student Senate will appoint a student representative to the committee. To ensure continuity, the president will appoint members of the Coordinating Team to serve on the Computing and Information Technology Planning Committee in 1995-96.

The role of the committee will be to recommend to the Executive Council institutional policies and procedures related to computing and information technology. The committee will be responsible for updating the five-year information and communication technology plan each spring to insure currency of the plan. The committee will appoint project teams to prepare feasibility studies for technology projects to be implemented in the future. The committee will also encourage teams to form and to prepare feasibility studies for future reviews. These studies will be submitted by March 1 of each spring so that the committee can review them and set the priorities for projects to be funded. Incorporating the teams' recommendations, the committee will revise the five-year plan and present it to the president.

Before new projects which require a major commitment of College resources are implemented, a team will be charged to study a clearly defined problem or need that is narrowly focused. Each team will know the constraints or parameters under which it works so that recommendations will be practical options for the College. The study will include a statement of expected outcomes, a cost/benefit analysis, training requirements, estimated time lines associated with project tasks, and an evaluation plan to determine if the outcomes are achieved once the project is implemented.

The committee will select two to three team members who have interest in the project because of its potential impact on their work. One technology expert, who may be involved

in implementing the proposed technology, will serve on the team. The team leader is responsible for project management while ensuring that team members share responsibility for the study. Team leaders and members should receive training to ensure that everyone has the required team skills.

After a project has been approved for funding by the president, the implementation team will be appointed. In most cases, the team proposing the project will also be implementing it. However, new members may need to be assigned to carry out the implementation phase. In all cases, users will serve on the implementation team, and in most cases a user will be the leader. The project should always address the needs as identified by users, and the user must assume responsibility for it meeting the requirements.

Because planning and implementing projects are very dependent upon project teams, training in working as a team is essential. The Professional Development Committee will develop a training program to prepare faculty and staff to be effective team members and facilitators.

The Computing and Information Technology Planning Committee will appoint subcommittees to carry out ongoing activities. The Hardware and Software Standards Committee, established by the Steering Committee in 1994, will continue as a subcommittee with representation from faculty and staff. This subcommittee will review and propose to the Computing and Information Technology Planning Committee revised campus hardware and software standards as well as network standards.

An evaluation subcommittee will review the outcomes data presented by project teams and make judgments regarding the worth of projects through comparing expenses in terms

of both dollars and time commitment to the benefits derived by the College. This subcommittee will recommend to the Computing and Information Technology Planning Committee projects for continuation, expansion or enhancement, or termination. Thus, implementation teams must be able to demonstrate the outcomes of the project and its benefits to the College to ensure continuation.

The Information and Communication Technology Advisory Committee has assisted in the planning process and will be an important entity in the implementation of the plan. The Advisory Committee will meet no more than once or twice each year to review the progress of the College in implementing its plan and to review the proposed updated plan with new projects. Advisory Committee members will be asked to consult with project teams exploring technological solutions to identified problems.

The Professional Development Subcommittee will receive recommendations from the Computing and Information Technology Planning Committee for training based upon the approved projects. Using these recommendations, the Professional Development Subcommittee will develop and implement appropriate training programs.

By May of each spring, the Computing and Information Technology Planning Committee will submit to the Executive Council the recommended five-year plan. The Executive Council will act upon the recommendations, and the president will use the plan in making budget allocations. Projects approved for implementation but lacking funds to support will be referred to the director of Resource Development who will coordinate activities to solicit external funding. For these projects, implementation will be contingent upon acquiring external funds.

The Computer Services Department will provide the technical expertise and staff support for implementing and maintaining the campus network, administrative systems, faculty/staff computers and peripherals, and instructional computer laboratories. Support for developing and implementing instructional technology will be provided from Media Services, the to-be-developed instructional development center, and the new position of coordinator, Instructional Computing. The Instructional Development Committee will make recommendations to the vice president/executive dean to address faculty needs for support. The distance learning team will address the support needs for delivering instruction over the North Carolina Information Highway, the Internet, and ITFS channels.

Evaluation Process

As previously referenced, each feasibility study presented by a project team must include statements of expected outcomes and an evaluation plan. The evaluation plan must include a description of data to be collected and analyzed, a time line for collecting and reporting the data, and identification of persons responsible for these tasks. Once a project is approved and implemented, the project leader will be responsible for an annual evaluation report submitted to the evaluation subcommittee. Annual evaluations will be required as long as that project is included in the five-year technology plan. Once the project has been fully institutionalized, evaluation or status reports will be necessary only as requested by the Computing and Information Technologies Planning Committee.

Whenever possible, units should include the technology projects in their institutional effectiveness plans. The annual institutional effectiveness progress reports should report the outcomes and may substitute for the evaluation reports required by the Computing and

Information Technologies Planning Committee. When appropriate, existing data collection procedures may be used, including data from the annual surveys of graduates and former students; surveys of enrolled students and faculty/staff; evaluations of courses; tests and assessments used in courses; and supervisor's evaluations of employee's performance. Specialized tests or surveys may be developed and administered to address objectives not easily assessed through existing data sources. The Evaluation and Research Department will assist in incorporating items that evaluate specific objectives into regular evaluation instruments. Ultimately, responsibility for evaluation resides with the implementation team.

The Computing and Information Technologies Planning Committee is responsible for annually reviewing projects as it updates the plan. Based on the report from the evaluation subcommittee and budgetary data, the committee may choose not to recommend the continuation of projects that are less useful or have less return for the cost than other potential projects.

CHAPTER 7: CONCLUSION

The information and communication technology plan has had a major impact during the 1995-1996 year even though the final plan was published in 1996. Computer-related equipment and staffing decisions were based upon the recommendations of the report. Some examples of outcomes consistent with the first-year strategies of the plan are described below.

Staffing of Computer Services received priority in 1995-96. A new position of Network Engineer was allocated, and an individual was hired November 1, 1995. An existing position was reallocated as System Administrator/Operator, and a person with UNIX experience was hired in January 1996. This position is to assist in the conversion to the UNIX platform. The PC Technician position was upgraded from a continuing part-time, 35-hour position to a full-time, 40-hour position.

The Network Engineer is completing detailed plans for wiring White Building. Vendors are submitting bids for installing the fiber backbone in White Building, and the hardware requirements are currently being reviewed. The Internet router and T1 line have been installed. By the end of 1995-96 fiscal year White Building will be networked and plans for laying the fiber optic cabling to connect all the buildings on Lawson Street will be completed. The Durham County Commissioners have allocated funds over the next two fiscal years for the wiring project.

Summer of 1995 was a time for planning for the new telephone system, which was fully operational on October 1, 1995. Voice mail has given students access to faculty, and the automated attendant routes callers directly to offices. A traffic analysis showed that there were no blocked calls, either incoming or outgoing, after switching to the new system. The

video bulletin board system was funded and developed in the fall of 1995, and monitors have been installed in White and Phillips buildings.

Personal computers and printers were purchased and are being installed in each classroom building for faculty use. Room 510 of the Educational Resources Center will serve as a temporary location for an instructional development center.

In the fall of 1995 the College began issuing barcoded student identification cards that are used for checking out library books. Other uses of the barcoded identification cards will be explored.

The Computer Hardware and Software Standards Committee regularly updates the standards and continues to explore software requirements for the campus.

The coordinator of External Grants has developed several letter proposals for funding specific projects. The Foundation Board, with direction from the president and the director of Resource Development, is preparing to initiate a capital fund drive to raise money in support of the technology plan.

Professional Development Committee funded three faculty to attend a multimedia development workshop, and these faculty are now training other faculty. Health technologies faculty are using multimedia applications in classrooms, using hardware funded through a small equipment grant and software funded by the Foundation.

The Computing and Information Technology Planning Committee was appointed in January 1996 and will assume the role of updating the plan in the spring of 1996. Project teams will be appointed to develop proposals and recommendations and to implement projects.

Although the plan is ambitious, steps toward implementing the key projects have already been taken. The annual review of the plan will ensure a realistic appraisal of what can be accomplished with existing staff and financial resources. Through establishing high expectations with specific plans to accomplish its goals, Durham Technical Community College will become an educational leader in the use of information technology for instructional delivery and administrative services.

APPENDIX A: MEMBERS OF COMMITTEES

STEERING COMMITTEE

Brenda H. Rogers	Chair, Director of Self-Study
Linda M. Green	Vice Chair, Instructor, Business Computer Programming
Jesse Anglin	Chair, Board of Trustees
Barbara A. Baker	Associate Dean, Off-Campus and Special Programs
William M. Bilbrey	Program Director, Architectural Drafting
Dorothy B. Brokaw	Assistant to the President
Arthur L. Clark	Dean, Adult and Continuing Education
Duane A. Dreyer	Instructor, Biology
Jill Smith Haughton	Dean, Student Services
Pat Hemingway	Director, Human Resources
William G. Ingram	Vice President/Executive Dean
Terry C. Lowrance	Program Director/Instructor, Business Administration
Edward E. Moore	Business Manager
Sheri Oswald	Student Representative
Mary Ann Peter	Vice Chair, Board of Trustees
Jim Ragsdale	Instructor, Business Computer Programming
Sandra Roman	Student Representative
Lou Russell	Director, Resource Development
Levern Williams Jr.	Instructor, Mathematics
J. Michael Woodard	Ex Officio, Self-Study Editor, Publications Editor

INSTITUTIONAL EFFECTIVENESS COMMITTEE

Brenda H. Rogers	Chair Dean, Institutional Research and Information Resources
Terry C. Lowrance	Vice Chair Program Director/Instructor, Business Administration
Dorothy B. Brokaw	Assistant to the President
Joan S. Carter	Coordinator/Instructor, Biology/Science
Arthur L. Clark	Dean, Adult and Continuing Education
Janyth A. Fredrickson	Dean, Arts and Sciences
Linda M. Green	Ex Officio, Vice Chair, Steering Committee
Jill Smith Haughton	Dean, Student Services
Roberta R. Havner	Coordinator, Student Records and Financial Aid
Ronald H. Hilbert	Coordinator, Evaluation and Research
William G. Ingram	Vice President/Executive Dean
Patricia C. Jones	Director, Admissions and Registration
Donald R. Kritsch	Associate Dean, Health Technologies Program Director, Pharmacy Technology
Jerry McDaniel	Ex Officio, Committee Editor Admissions Counselor
Edward E. Moore	Business Manager
Paul Nagy	Coordinator, Institutional Effectiveness
Russell Pratt	Associate Dean, Industrial and Engineering Technologies
Lou Russell	Director, Resource Development
Charles A. Slappy	Instructor, Sociology

ADMINISTRATIVE SYSTEMS PLANNING COMMITTEE

Barbara Baker	Chair, Associate Dean
Jim Ragsdale	Vice Chair, Instructor, Business Computer Programming/Microcomputer Systems Technology
Juani Beaver	Executive Secretary/Administrative Assistant, President's Office
Leland Dixon	Security Coordinator
Martha Dreyer	Advising Coordinator
Dorothea Eley	Data Management Coordinator
Terri Ettson	Personnel Services Coordinator
Patricia Jones	Director, Admissions and Registration
Ruth Lewis	Assistant Dean, Adult Education
Anna Mason	Clerical Services Manager
Mary Rhoden	Communications Technician
Beth Rimmer	Graphic Artist/Designer
Tom Russo	Coordinator, Career Planning and Placement
William Sewell	Ex Officio, Committee Editor Coordinator, External Grants
Alma Squires	Secretary, Adult and Continuing Education
Tim Woo	Instructor, Electronics Engineering Technology
Robbie Workman	Accounting Systems Technician
Ken Bergman	Computer Services Director
Paul Nagy	Coordinator, Institutional Effectiveness

INSTRUCTIONAL TECHNOLOGIES PLANNING COMMITTEE

Duane Dreyer	Chair, Instructor, Biology
William Bilbrey	Vice Chair, Program Director/Instructor, Architectural Drafting
Rita Buhr	Instructor, English
Gordon Copeland	Assistant Dean, Continuing Education
Marsha Cupitt	Program Director/Instructor, Associate in Arts
Richard Godfrey	Media Services Specialist
Chris Herring	Instructor, Criminal Justice
John K. Hill	Program Director/Instructor, Paralegal Technology
Mongy Ibrahim	Instructor, Accounting
Irene Laube	Coordinator, Library Services
Richard Miller	Program Director/Instructor, Respiratory Care Technology
Beatrice Muhammad	Program Director, Adult High School Program
MaryGrace Paul	Ex Officio, Committee Editor Instructor, English
Evelyn Sanes	Acting Director, Business Computer Programming Microcomputer Systems Technology
Billie Sessoms	Instructor, Business Computer Programming/Microcomputer Systems Technology
Phyllis Spray	Instructor, English
Dwight Tichenor	Instructor, Adult and Continuing Education/Curriculum

Chester Waters	Director, Orange County Centers & Weekend College
Charlene West	Program Director/Instructor, Medical Office Technology
Debbie Yang	User Services Analyst

STUDY GROUPS

JOINT STUDY GROUPS

formed by the Administrative Systems Planning Committee
and the Instructional Technologies Planning Committee
co-chaired by a member from each committee

INFRASTRUCTURE/INTERNAL COMMUNICATIONS

Charge: 1. To study the current status and future infrastructure needs for the implementation of information technologies in the instructional and administrative areas of the College, and to make recommendations for inclusion in the information technology and communications plan. Infrastructure to include, but not limited to, wiring, networks, hardware standards, software standards, network standards, interaction with the North Carolina Information Highway (NCIH), and data and video applications. 2. To examine the need for implementing an internal communication system including electronic mail, electronic bulletin boards, video bulletin boards, and information stations; and to recommend the equipment and software to implement such a system.

Billie Sessoms, co-chair
Director of Computer Services, co-chair
Richard Godfrey
Linda Green
Ralph Matthews
Jeff Nanagas
Tim Woo
Debbie Yang

STUDENT INFORMATION SYSTEMS

Charge: 1. To study current student services, advising, and computer security issues to determine if information technology applications could enhance the service delivery to students and faculty, and to make recommendations for implementation of information technology applications to improve service delivery. 2. To plan for direct connection of faculty and administrative systems for access and input related to advisement and grades.

Martha Dreyer, co-chair
Chester Waters, co-chair
Lee Dixon
Tom Russo
Lisa Schwartz

TECHNOLOGY TRAINING

Charge: To develop a plan for the continued training of faculty and staff in the use of information technology and the emerging trends in the field related to both instructional and administrative systems.

Terri Ettson, co-chair
Gordon Copeland, co-chair
John Hurlburt
Helen Thompson

ADMINISTRATIVE SYSTEMS PLANNING COMMITTEE STUDY GROUPS

PHYSICAL PLANT AND OTHER AUXILIARY ISSUES

Charge: To study the areas of maintenance, housekeeping, mail and package delivery, and central supply to determine how information technologies can be used to increase productivity, and to make recommendations for implementing appropriate information technologies.

Dorothea Eley, chair
Ann Faircloth
Roy Patillo
Russell Pratt
Robbi Workman

TELEPHONE SYSTEM

Charge: To study the needs of the College as they relate to upgrading the current telephone system and make recommendations for possible purchase and implementation of a new system.

Juani Beaver, chair
Samuel Calderone
Mary Rhoden
Adrienne Williams
Mary Winborne

WORD PROCESSING, CLERICAL SUPPORT, PRINTING SERVICES, AND PUBLICATIONS

Charge: 1. To study campus-wide clerical support and recommend information technology applications to enhance the availability of word processing and clerical support services for faculty and staff. 2. To study the areas of publications, printing, and photocopying to consider how information technology can be used to meet the needs of the College. 3. To make recommendations for implementation strategies.

Beth Rimmer, chair
Dora Bailey
Randy Egsegian
Chris Jones
Anna Mason
Nina Smith

ENHANCEMENT OF ADULT AND CONTINUING EDUCATION OPERATIONS

Charge: To study functions withing the Adult and Continuing Education Division to discover how information technologies could be used to enhance the operations, and to make recommendations for information technology applications based on the needs of the College.

Ruth Lewis, chair
Al Jernigan
Paul Nagy
Alma Squires

ADMINISTRATIVE/ACADEMIC COMPUTING SUPPORT SERVICES

Charge: 1. To study the administrative processes that are part of the software packages provided to the College by the Department of Community Colleges, and to determine any Durham Tech needs related to the software and any enhancements needed in terms of software reconfiguration possibilities, efficiency of administration of the systems, and access for Durham Tech personnel. 2. To study the operations of the personnel function to determine the needs of the College and make recommendations for appropriate applications of information technologies. 3. To study institutional research needs and recommend information technology applications and enhancements to be used to improve the ability of College personnel to collect and analyze information. 4. To study the needs for campus management of information technologies and user support for the College, and

to recommend equipment, software, staffing, and processes for the implementation of the information technology and communications plan.

Jim Ragsdale, chair
Director of Computer Services
Mary Anne Grabarek
Charles Hunt
Rosallene Massey
Pat Jones
Brenda Rogers

INSTRUCTIONAL TECHNOLOGIES PLANNING COMMITTEE STUDY GROUPS

CLASSROOM TECHNOLOGIES

Charge: To provide a plan for the classroom implementation of information technologies and presentation modes including multimedia, CD-ROM, laser disk, automated manufacturing, and distance learning.

Evelyn Sanes, chair
Lynn Eisenberg
Richard Miller
Ben Shaw
Margaret Skulnik

LEARNING RESOURCES SUPPORT

Charge: To study College needs and library operations, and to provide a plan for the implementation of technology applications designed to enhance access to information. Examples of technologies to be explored are the Internet, the North Carolina Information Highway, and other information retrieval systems, both internal and external.

Irene Laube, chair
Maria Fraser-Molina
Chris Herring
Ken Hill
Mongi Ibrahim

COMPUTER LABS

Charge: To provide a plan for the establishment of an "open" computer learning laboratory, accessible to all programs, which would serve as a hub, providing access to and from other institutional sites.

Charlene West, chair
Walter Bartlett
Steve Rowley
Phyllis Spray
Debbie Yang

MANAGING INSTRUCTIONAL PROCESSES

Charge: To evaluate current faculty use of technology in instructional management, and to provide a plan for the expansion of instructional mangement technology with tools such as word processing, database management, test banks, grade management, and scanning technology.

Marsha Cupitt, chair
Rita Buhr
Dwight Tichenor
Ken Weaver

APPENDIX B: SURVEY RESULTS

STUDENT SURVEY OF CAMPUS COMPUTING

Status - All Surveyed Students N = 571

	Frequency					
	0	1	2	3	4	Mean
2. Appr. Computer hardware is used for classes	106	25	49	268	123	3.05
3. Hardware kept in good working order	107	24	72	246	122	3.00
4. Appr. computer software is used for classes	108	26	62	246	129	3.03
5. Enough access to a computer lab	119	80	119	149	104	2.61
6. Current technology is used in the classes	83	29	63	266	130	3.02
7. I will be adequately prepared for employment	104	24	91	250	102	2.92
8. Computers used for support services	193	25	69	215	69	2.87

Scale
0 Not applicable/do not know
1 Strongly disagree
2 Disagree
3 Agree
4 Strongly agree

INSTRUCTIONAL COMPUTING SURVEY

118 Responses
74 of 102 (73%) of full-time instructors responded to the survey

Instructor's Name _____

[1-3] Program _____

[4] **Status:** 74 Full-time (63%) 39 Part-time (33%) 5 Continuing part-time (4%)

PLEASE ANSWER THE FOLLOWING QUESTIONS AS THEY RELATE TO YOUR RESPONSIBILITIES AT DURHAM TECH, WHETHER YOU WORK ON CAMPUS OR AT AN OFF CAMPUS SITE. THIS INFORMATION WILL BE USED AS PART OF THE SELF-STUDY.

[5] **Do you have a personal computer on your desk?** (36%) 43 A. Yes (60%) 71 B. No (3%) 4 Brought their own computer

If yes, describe the computer:

[6] Type of machines:

(35%) 16 A. IBM
(26%) 12 B. IBM clone
(26%) 12 C. MacIntosh/Apple
(13%) 6 D. Other

[7] Model

(32%) 12 A. 386
(13%) 5 B. 486
(55%) 21 C. Other

[8] Operating system

(22%) 10 A. Windows
(67%) 31 B. MS DOS
___ C. Apple OS
(26%) 12 D. MacIntosh
___ E. OS2
___ F. UNIX

[9-11] Version

9 (3.1)
6 (3.x), 1 (4.0), 5 (5.0), 6 (6.x)
_____
1 (7.0)
_____
_____

(Total percent exceeds 100, some respondents have Windows and MS DOS)

[10] **Is the PC on a network? If so, what type?**

(91%) 42 A. Not networked
___ B. Apple Talk
(7%) 3 C. Ethernet
(2%) 1 D. Token Ring
___ E. Other (please describe)_____

[11] **If no, do you have convenient access to a PC?** (45%) 29 A. Yes (55%) 35 B. No

[12] **If no, do you need a computer to carry out your job responsibilities?**

(80%) 28 A. Yes (20%) 7 B. No

[13] **Rate the importance of instructional computing in your area.**

(10%) 12 A. Not important for instruction
(22%) 26 B. Could be incorporated into instruction but not essential
(25%) 29 C. Important for instruction
(43%) 51 D. Very Important for instruction Mean 3.01

If you use a computer at work, check all applications that apply.

[70%]	83	Word processor	[14%]	17	Communications software
[29%]	34	Database	[38%]	45	Teaching tool
[15%]	18	Desktop publishing	[37%]	44	Managing classes (grades, etc.)
[30%]	35	Graphics	[66%]	78	Preparation of class materials
[30%]	35	Spreadsheet	[10%]	12	Other, please specify
[16%]	19	Programming			

Primary language_____ _____

What limits your use of computers at Durham Tech? Check all that apply.

[56%]	66	Lack of equipment	[33%]	39	Out-dated or malfunctioning equipment
[46%]	54	Lack of software	[28%]	33	Out-dated software
[32%]	38	Lack of training	[25%]	29	Lack of time to develop applications
[31%]	36	Lack of time to learn	[10%]	12	Other, please specify
[14%]	17	Lack of service/maintenance			

_____

In your opinion, Durham Tech students need: (check all that apply)

[72%] 85 more access to a computer lab.
[54%] 64 more computer simulations and demonstrations in their courses.
[46%] 54 exposure to a greater variety of software.
[27%] 32 short workshops on special aspects of computing such as:

_____

[11%] 13 other, please specify _____

[39] **Rate graduates from Durham Tech regarding their preparation for employment in business or industry where ability to use current technology may be crucial.**

(7%)	8	A. Not at all prepared (1)	
(55%)	65	B. Somewhat prepared (2)	
(18%)	22	C. Well prepared (3)	Mean 2.15 (3 point scale)
(19%)		(23 no response)	(zero excluded)

[40] **Rate the <u>hardware</u> support you receive from Computer Services.**

(54%)	64	A. Do not receive support from Computer Services (0)	
(9%)	11	B. Poor (1)	
(15%)	18	C. Fair (2)	Mean 2.37 (4 point scale)
(16%)	19	D. Good (3)	(zero excluded)
(5%)	6	E. Excellent (4)	

[41] **Rate the <u>software</u> support you receive from Computer Services.**

(57%)	67	A. Do not receive support from Computer Services (0)	
(8%)	9	B. Poor (1)	
(18%)	21	C. Fair (2)	Mean 2.31 (4 point scale)
(14%)	17	D. Good (3)	(zero excluded)
(3%)	4	E. Excellent (4)	

ADMINISTRATIVE/STAFF COMPUTING SURVEY

70 Responses
54 of 92 (59%) of full-time staff responded to the survey

Name _____

[1-3] Division/Department _____

[4] Status: 54 A. Full-time (77%) 3 B. Part-time (4%) 13 C. Continuing part-time (19%)

PLEASE ANSWER THE FOLLOWING QUESTIONS AS THEY RELATE TO YOUR RESPONSIBILITIES AT DURHAM TECH, WHETHER YOU WORK ON CAMPUS OR AT AN OFF CAMPUS SITE. THIS INFORMATION WILL BE USED AS PART OF THE SELF-STUDY.

[5] **Do you have a personal computer on your desk?** 39 A. Yes (56%) 29 B. No (41%)
(3%) 2 Brought their own computer

If yes, describe the computer:

[6] Type of machines:

(29%) 12 A. IBM
(20%) 8 B. IBM clone
(44%) 18 C. MacIntosh/Apple
(7%) 3 D. Other

[7] Model

(32%) 10 A. 386
(13%) 4 B. 486
(55%) 17 C. Other

[8] Operating system

(24%) 10 A. Windows
(46%) 19 B. MS DOS
(10%) 4 C. Apple OS
(34%) 14 D. MacIntosh
___ E. OS2
___ F. UNIX

[9-11] Version

2 (3.0), 7 (3.1)
1 (3.2), 2 (3.3), 1 (4.0), 3 (5.0), 7 (6.2)
1 (7.0)
1 (3.0), 1 (6.07), 1 (7.0), 1 (7.1)
_____
_____

(Total percent exceeds 100, some respondents have Windows and MS DOS)

[10] **Is the PC on a network? If so, what type?**

(93%) 38 A. Not networked
___ B. Apple Talk
(2%) 1 C. Ethernet
___ D. Token Ring
(5%) 2 E. Other (please describe) _____

[11] **Is your PC connected to the Prime?** 7 A. Yes (17%) 34 B. No (83%)

[12] **Do you have convenient access to a Prime terminal that is not a PC?**
(59%) 41 A. Yes (41%) 28 B. No

[13] If you do not have access to Prime, to do your job do you need access to Prime?
(37%) 11 A. Yes (63%) 19 B. No

Rate the importance of administrative computing in your area.

(1%) 1 A. Not important (1)
(9%) 6 B. Somewhat important (2)
(27%) 19 C. Important (3) Mean 3.40
(60%) 42 D. Very Important (4)
(3%) 2 (no rating)

If you use a computer at work, check all applications that apply.

[79%] 55 Word processor
[49%] 34 Database
[20%] 14 Desktop publishing
[17%] 12 Graphics
[39%] 27 Spreadsheet
[14%] 10 Communications software
[30%] 21 Prime Inform statements
[37%] 26 Data entry
[30%] 21 E-mail on Prime
[3%] 2 Programming
Primary languages _____
[1%] 1 Other, please specify _____

What limits your use of computers at Durham Tech? Check all that apply.

[49%] 34 Lack of equipment
[40%] 28 Lack of software
[43%] 30 Lack of training
[44%] 31 Lack of time to learn
[7%] 5 Lack of service/maintenance
[29%] 20 Out-dated or malfunctioning equipment
[21%] 15 Out-dated software
[24%] 17 Lack of time to develop applications
[10%] 7 Other, please specify _____

Check all the ways that increased use of computers could improve your job performance.

[39%] 27 Cost savings
[84%] 59 Increased efficiency/accuracy
[74%] 52 Increased job satisfaction
[13%] 9 Increased enrollment/retention of students
[61%] 43 Better management of resources and personnel
[60%] 42 Improved communications
[59%] 38 Improved quality of publications/documents
[79%] 55 Increased productivity
[7%] 5 Other (please specify) _____

Rate the <u>hardware</u> support you receive from Computer Services.

[34%] 24 A. Do not receive support from Computer Services (0)
[6%] 4 B. Poor (1)
[23%] 16 C. Fair (2) Mean 2.65 (zero rating excluded)
[26%] 18 D. Good (3)
[11%] 8 E. Excellent (4)

Rate the <u>software</u> support you receive from Computer Services.

[47%] 33 A. Do not receive support from Computer Services (0)
[6%] 4 B. Poor (1)
[11%] 8 C. Fair (2) Mean 2.70 (zero rating excluded)
[29%] 20 D. Good (3)
[7%] 5 E. Excellent (4)

APPENDIX C: INVENTORY OF HARDWARE AND SOFTWARE

COMPUTER INVENTORY

WHITE BUILDING

Bus Off	Offices 1-15	A/S	16	ADDS terminals		
			6		MacIntosh	6 printers
			2	old	IBM	2 printers
Counseling	Offices 23-28	A/S	1	XT	IBM	
			4		MacIntosh	2 printers
			1	ADDS terminal		
Adm/Reg	Office 30	A/S	5	mixed	IBM	8 printers
			1		MacIntosh	1 scanner
			19	ADDS terminals		
Storage	Room 33	A/S	1	old	2 terminals	3 printers
B. Rogers	Office 34	A/S	1	486	IBM (connected to Prime)	1 printer
Printing	Work area 42A	A/S	1		MacIntosh	1 Printer
Comm/Mark	Office 44	A/S	3	mixed	MacIntosh	2 printers, scanner
BCP/MST	Lab 49A	Stu	21	386	IBM clone	12 printers
BCP/MST	5 Offices 49A	Fac	5	486	IBM clone (networked to HP)	
	Office 49A5		1	old	Tandy	
P. Nagy	Office 49A3	A/S	1	486	IBM	1 printer
C. Hughes	Office 51A	A/S	1	ADDS terminal		
			1	286	IBM	1 printer
Comp Ser.	Outer office 55	A/S	2	ADDS terminals		
Comp Ser	Work Area 56 and Offices	A/S	1	486	IBM server	
			1	386	Laptop	16 printers
			1		MacIntosh	1 printer,
			3	286	IBM	1 scanner
			1	486	IBM	9 Modems, 1 optical drive
			2	486	IBM clone	2 Tape backup units
			2	8088	IBM	1 Bernoulli box
			1	Prime 4250		1 line printer

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			8		ADDS terminals	1 barcode reader
			18		ADDS terminals (stored in back room)	
			6		16 port multiplexor	1 data switch
			10		8 port multiplexor	1 UPS
			1		Document Shredder, 5 Walkie-Talkies	
R. Hilbert	Office 59	A/S	1		MacIntosh	1 printer
N. Smith	Office 62	Fac	1	286	IBM	1 printer
GOT/AOT	Lab 63	Stu	17	286	IBM	4 printers
GOT/AOT	Lab 64	Stu	20	386	IBM clones	6 printers
C. West	Office 69	Fac	1	386	IBM clone	1 printer (personal sys)
BCP/MST	Lab 70A	Stu	2	HP Mini Computer		1 line printer
			2	HP terminals		
BCP/MST	Lab 70B	Stu	20	386	IBM clone	4 printers
			10	8088	IBM & PS/2 server, Novell Network	
BCP/MST	Lab 70C-Open Lab	Stu	13	Mixed IBM & clones		12 printers
			18	HP Terminals		
(Terminals and 8 PCs plus 6 in 49A offices networked to HPs via Ethernet - TCP/IP)						
BCP/MST	Lab 71	Stu	20	486	IBM clone	5 printers
Med Off	Lab 72	Stu	8	XT	IBM	4 printers
			7	55SX	IBM	
Resp Care	Lab 75	Stu	1	386	IBM clone	1 Video disk player
			2	old	Apple (limited use, if any)	
R. Miller	Office 75A&B		Fac	1	old	MacIntosh (no usable software)
			1	old	Tandy	2 printers
OPT	Lab 78	Stu	1	486	IBM clone	1 printer
OPT	Lab 82 & 73A	Stu	2	286	IBM clone	1 printer (poor condition, limited use)
L. Green	Office 86	Fac	1	286	IBM	1 printer (on loan from Computer Services)
Human Res.	Office 87	A/S	1		MacIntosh	2 printers, 3 terminals
			156			

COLLINS BUILDING

ADN & PN	Classroom 208	Stu	2	old	IBM clone	1 printer	
			2	old	MacIntosh	1 printer	
			(all equipment almost unusable)				
Pharm Tech	Classroom 209	Stu	1	386	IBM (2 users)	1 printer	
K. Zarilla	Office 217	Fac	1	1000	Tandy		
D. Dreyer	Office 218	Fac	1	386	IBM clone	1 printer	
Math/Sci	Classroom 222	Stu	3		Mixed	1 printer	1 scanner
T. Snow	Office 225 & Classroom 259	Fac Stu	1	486	IBM (on rolling stand)	1 printer	
Math/Sci	Classroom 242	Stu	2		Apple	1 printer	
D. Bond	Office 244	Fac	1		IBM clone	1 printer	
			1	386	Laptop (shared)		
A. Tambe	Office 247	Fac	1	386	IBM clone		
M. Skulnik	Office 249	Fac	1	old	IBM (almost usable)		
J. Scanlon	Office 265	Fac	1		IBM clone		
L. Williams	Office 267	Fac	1	8088	IBM		
S. Rowley	Office 269	Fac	1		MacIntosh		
J. Carter	Office 271	Fac	1	8088	IBM		
N Avery	Office 273	Fac	1		MacIntosh	1 printer	
M. Davidai	Office 280	Fac	1		IBM	1 printer	

PHILLIPS BUILDING

Advising	Office 303	A/S	1	386	IBM clone	
			1		MacIntosh	1 printer
			1	ADDS terminal		
Faculty Center	Office 310	Fac	1	ADDS terminal		
Storage	Behind 310	A/S	16	ADDS Terminals		
Deans	Offices 311	A/S	3	386,486 IBM		3 printers
		Fac	2	486	Laptops (for use by faculty)	
Coll Trans	Office 312	Fac	2	386	IBM clone	2 printers
Assoc. Dean	Office 313	Fac	4		IBM	4 printers
D. Eley	Office 315	A/S	1	ADDS terminal		1 printer
K. Hill	Office 316	Fac	1	386	IBM	1 printer
Curr Dev	Office 317	A/S	1		MacIntosh	1 printer
E. Borynski	Office 318	Fac	1		Tandy	1 printer
G. Goss	Office 319	Fac	1		IBM	1 printer
ACC/BA	Lab 357	Stu	20	286	IBM	10 printers
MAC Lab	Lab 363	Stu	16	SE	MacIntosh	4 printers
C. Portaro	Office 361	Fac	1		Tandy	1 printer
M. Ibrahim	Office 362	Fac	1		IBM	1 printer
L. West	Office 367	Fac	1	386	IBM	1 printer
M. Grabarek	Office 368A	Fac	1		Tandy	
R. Hackley	Office 368B	A/S	1		IBM	1 printer, 1 terminal
A. Jernigan	Office 377	Fac	1		MacIntosh	
K. Tate	Office 380	Fac	1	286	IBM	

R. Buhr	Office 383	Fac	1	XT	IBM	
M. Dreyer	Office 389	A/S	1	ADDS terminal		1 printer

NEWTON BUILDING

C. Southard	Office 401	A/S	1		MacIntosh	1 printer
R. Pratt	Office 403	Fac	1	386	IBM	1 printer
B. Bilbrey	Office 408	Fac	1	286	Compaq	
P. Johnson	Office 409	Fac	1	XT	IBM	
B. Shaw	Office 410	Fac	1		IBM clone	1 printer
K. Weaver	Office 411	Fac	1		MacIntosh	1 printer
Drafting	Lab 419	Stu	10	486	IBM	2 printers, pen plotter
D. Barringer	Office 421	Fac	1	XT	IBM	1 printer
E. Clark	Office 424	Fac	1		IBM	1 printer
W. Bartlett	Office 428	Fac	1		MacIntosh	1 printer
			1		Alton	
L. Schwartz	Office 429	A/S	1	XT	IBM	1 printer
DER	Lab 430	Stu	4	286	Alton	2 printers
			10	GS	Apple II	2 plotters
			1	Plus	Apple II	
			1		Apple	
DER	Lab 430B	Stu	6		Marcraft	
			1	GS	Apple II	
Electronics	Lab 432	Stu	20	486	Compaqs	20 printers
					(connected via Microselect Video System)	
T. Woo	Office 433	Fac	1		MacIntosh	1 printer
R. Thayer	Office 434	Fac	1	386	IBM clone	1 printer
J. Painter	Office 435	Fac	1		MacIntosh	1 printer
W. Taylor	Office 436	Fac	1		MacIntosh	1 printer
			1		IBM	

	Lab 437	Stu	5	GS	Apple II	1 plotter
			4	Plus	Apple II	
			1	E	Apple II	
	Lab 437B	Stu	6	XT	IBM	
			1		IBM portable	
			2		Leading Edge	
			1		HP	
	438	Fac	1	GS	Apple II	1 printer
	438B	Stu			2 plotters	6 printers
C. Brandon	Office 440	Fac	1		IBM	
G. Sharpe	Office 442	Fac	1		IBM	1 printer
	On rolling cart	Fac	1	386	IBM PS 2/70	1 printer

EDUCATIONAL RESOURCES CENTER

President's suite	Offices 504	A/S	3		MacIntosh 2 printers
			1		IBM 1 printer
			1		ADDS terminal
Library	Circulation info & front desk	Stu	1	486	Value Point Server
			4	286	IBM (Networked using Winnebago
			1	XT	IBM online catelog & Circulation system)
			1	AT	IBM (for Westlaw)
			3	286	mixed (for Newsbank) plus 2 leased PCs
I. Laube	Office	A/S	1		MacIntosh
R. Godfrey	Office 507	A/S	1	286	IBM (on loan from Curr Center)
Media Ser.	Work Area 508	A/S	1		ADDS terminal
Graphic Arts	Work Area 509	A/S	1	SE	MacIntosh 1 printer
			1		IBM 1 ADDS terminal
B. Stone	Office 512	A/S	1	SE	MacIntosh 1 printer
Curriculum Center	Lab 519C	Stu	4	486	IBM (3 on loan from Math Dept.)
			8	286	IBM 4 printers
			3	IIe	Apple
			2	Clas.	MacIntosh
			2		IBM Desklab work stations
			2	old	IBM

CONTINUING EDUCATION BUILDING

Sec. area	Work area 600	A/S	7	old	IBM	3 printers
			1		MacIntosh	1 printer
			7		ADDS terminals	
Training Lab	Lab 607	Stu	21	486	IBM	2 printers, CD ROM
			1	486	IBM server	tape backup system
				(Novell network being installed)		

SKILL DEVELOPMENT CENTER

ESL	Lab 710	Stu	10	old	IBM	3 printers

SMALL BUSINESS CENTER

Business Center	Work Area 5BC	Stu	1	486	IBM	1 printer, Multimedia
			1	286	IBM	1 printer

NORTHERN DURHAM CENTER

B. Baker	Office	A/S	1	Clas	MacIntosh	1 printer
B. Batts	Office	A/S	1	LCII	MacIntosh	1 printer
C. Harbour	Office	Fac	1	Clas	MacIntosh	1 printer
S. Thompson	Office	Fac	1	SE	MacIntosh	1 printer
W. Sewell	Office	A/S	1	386	IBM clone	1 printer
C. Herring	Office	Fac	1		IBM clone	1 printer
Reception Area		A/S	2	ADDS terminals		
			4	ADDS terminals (for registration)		
Administrative Office area/ part-time faculty		Fac	1	Clas	MacIntosh	1 printer
			1		IBM clone	1 printer
R. Egsegian	Office	Fac	1	XT	IBM	1 printer
			1	Clas	MacIntosh	
NDC	Lab 111A	Stu	20	486	IBM	6 printers, Ethernet hub
			1	486	IBM server	Tape backup unit,
(Novell network installed, not yet working)						
(Microselect Video Switching installed, not yet working)						
NDC	Lab 111B	Stu	17		MacIntosh	5 printers
(Microselect Video Switching installed, not yet working)						
Library		A/S	1	486	IBM	1 printer
C. Woods	Office	A/S	1	XT	IBM	1 printer
Storage	Room 128	A/S			Scanner (for MacIntosh)	

APPENDIX D: HARDWARE AND SOFTWARE STANDARDS

TECHNICAL STANDARDS FOR COMPUTER HARDWARE
DURHAM TECHNICAL COMMUNITY COLLEGE

The two major end users of computer hardware and software are the academic and administrative divisions of the college. The acquisition of hardware by the administrative division is directed by state contracts. Specific information which identifies vendors and equipment for administrative applications is found in the N.C. Department of Administrations manual titled Microcomputer Contracts for all Executive State Agencies, dated May 10, 1994.

HARDWARE GROUPS

Minimum technical specifications have been grouped in the following six categories:

1. Desktop Systems
2. Network Servers
3. Displays
4. Cards & Adapters
5. Printers
6. Other

MINIMUM TECHNICAL SPECIFICATIONS FOR "DESKTOP COMPUTERS" FOR INSTRUCTIONAL LAB SETTINGS

"Intel" Family	"Mac" Family
*486 DX 66 MHZ UPGRADEABLE CPU	*040 PROCESSOR 60 MHZ
*16 MB RAM, EXPANDABLE TO 32 MB	*POWER PC UPGRADEABLE
*300 MB HARD DRIVE	*16 MB RAm
*5 SLOTS	*300 MB HARD DRIVE
*3 12" DISK DRIVE	*BUILT IN ETHERNET CONNECTION
*PRELOADED OPERATING SYSTEM SOFTWARE, MOST CURRENT	*PRELOADED OPERATING *SYSTEM SOFTWARE, MOST CURRENT
*THREE-YEAR WARRANTY, NEXT DAY ON-SITE SERVICE	*THREE-YEAR WARRANTY, NEXT DAY ON-SITE SERVICE

REVISED 9/12/1995

MINIMUM TECHNICAL SPECIFICATIONS FOR SERVER COMPUTERS

*INTEL PENTIUM 90 MHZ
UPGRADEABLE CPU
*64 MB RAM, EXPANDABLE TO 128 MB RAM
*1 GIG STORAGE SCSI II HARD DRIVE
*EXTERNAL CACHE MEMORY 128K
*6 SLOTS
*MOUSE PORT
*PARALLEL PORT
*INTERNAL 3.5" DRIVE
*14 MS ACCESS TIME
*32 BIT DISPLAY ADAPTER
*15 INCH DISPLAY
*101 ENHANCED KEYBOARD
*MICROSOFT MOUSE
*OPERATING SYSTEM, LATEST VERSION
*TAPE BACK UP W/250 MB COMPRESSED STORAGE CAPACITY
*CD-ROM 4X
*ETHERNET 16 BIT
*10BASE-T (RJ-45)
*NOVELL 3.2
*ONE-YEAR WARRANTY, NEXT
DAY ON-SITE SERVICE

MINIMUM TECHNICAL SPECIFICATIONS FOR DISPLAYS

14" VGA COLOR

MINIMUM TECHNICAL SPECIFICATIONS FOR CARDS & ADAPTERS

ETHERNET 16 BIT, 10BASE-T (RJ-45) LEVEL 5 CABLE

MINIMUM TECHNICAL SPECIFICATIONS FOR PRINTERS

Category	Suggested MFG.
Dot Matrix (24 pin)	Okidata
Inkjet (4 MB BUFFER)	HP Deskjet 560
Laser (4 MB BUFFER)	HP LASER JET IV (MODEL 4L = 2 MEG, NO UPGRADE) (MODEL 4L+= 4 MEG, NOT CURRENTLY ON STATE CONT.)

REVISED 9/12/1995

MINIMUM TECHNICAL SPECIFICATIONS FOR OTHER ITEMS

This category will include scanners, digitizers, plotters and other specialized items. Technical specifications for this group will be based on an item-by-item basis.

STANDARD
REVISED 9/12/1995

DURHAM TECHNICAL COMMUNITY COLLEGE
Computer Services
1637 Lawson Street
Durham, North Carolina 27703
Wiring Standards

9/20/95 revision

Philosophy and Design

The Durham Tech Wiring Plan is a set of standards for communications wiring inside new and renovated Durham Tech buildings. It provides common outlet support for voice, data, and single path video communication. The wiring serves both as a backbone for intra-building communication systems and as a means of access to services outside the building, whether on the Durham Tech campus or beyond. It supports today's pervasive communication technologies as well as providing sufficient flexibility and extra capacity to meet future needs without rewiring. It is a minimal standard; it specifies the minimum communication wiring and related equipment to be installed. Additional wiring will typically be required in certain locations to meet specific needs of the building's occupants. Building occupancy and use change so current occupants cannot opt for less than this standard. The Wiring Standard also provides a framework for management of the wiring plant.

The Durham Tech campus-wide network (DTCCNet) is a major initiative. The College is moving from a few small isolated networks to a fiber backbone based ethernet supporting approximately fifteen networked computer classrooms and labs, and network connections to all classrooms and offices. Computer support should grow to support this expanded network with a division of Administrative Computer Services which will support administrative computing, the campus-wide backbone, and telephone services and an entirely separate and independent Academic Computer Services which will support classrooms and labs as well as College Internet accounts.

The move from minimal network to full service network requires a sizeable investment in infrastructure, hardware, software and management personnel. After visiting several community colleges and other sites to study successful networks and seeing presentations by network hardware manufacturers and wiring installers, the SACS Infrastructure study group reached the conclusion that it would be wise to draw on the collective wisdom of local educational institutions that have experienced data communication staff and have researched product usefulness for their campuses and also rely on the expertise of the data communications engineers in the State Telecommunications office. The study group is aware that hardware from various manufacturers can function together but efficiency of function and effective management software comes with standardization. With that principal in mind and based on recommendations from local area network managers, the group is recommending a fiber optic backbone with the fiber bundles, connectors, and hardware from Siecor or of comparable quality. By utilizing the State Office of Telecommunications

assistance and vendor choices, the College will have an added assurance that the backbone will be tested and functioning and not have connection flaws. If the backbone is adequately tested and guaranteed as to its integrity at installation, it is a reasonable expectation that, barring excavation cuts, it will function well into the future.

The Study Group recommends the formation of an Advisory Committee for Communications consisting of faculty and staff members from all areas of the College and including as many of those College personnel who have experience with any aspect of telecommunications hardware and wiring as possible and several representative of area institutions who have wiring and telecommunications duties. This group would have responsibility for monitoring the process of installation and support of the campus-wide infrastructure and approve all changes to the wiring standards proposed by Computer Services. In addition, this group would advise Computer Services on developments and trends that might have impact on the College infrastructure.

The Study Group recommends wiring ethernet with TCP/IP campus-wide. With the switches being developed for more efficient use of 10Mbs Ethernet within logical workgroups and the possibility of 100Mbs Fast Ethernet to the desktop, and a choice of FDDI or ATM as campus backbone, the group has specified category 5 twisted pair to the desktop. With the pervasive presence of Ethernet, the bulk of new network advances support this standard with the result that our hardware investments will function for many years and integrate into whatever backbone technologies the College may choose. Beyond 10Mbps Ethernet, the study group did not recommend the backbone protocol since developments are occurring at a rapid pace and a choice made now might not be relevant to telecommunications developments over the next year. For this reason, the study group recommends that the DTCC network administrators stay abreast of technical developments.

To achieve efficient integration in the future as well as efficient management now, the Study Group recommends that the College standardize on Bay Networks/Synoptics intelligent hubs. After looking at several brands of hardware, all with the high level of functionality the College network will require, the group's decision was strongly influenced by the fact that the State Telecommunications office had conducted a study and gone through the bid process to choose a brand of intelligent hubs for state convenience contract. Bay Networks products won this bid. Bay Networks hardware has all the functionality the College requires and its management software is powerful. Hardware support contracts through the vendor that won the state convenience contract are favorably priced and vendor support personnel are based in the area. Bay Networks is a stable company committing resources to product development and support. Because of the very favorable state contract prices for both hardware and support the Study Group reached the conclusion that this technology would give the College the best long term return on dollars invested in the network infrastructure and hardware.
The Study Group recommends that the College standardize on Cisco Routers. The NSF grant through MCNC specifies that the Internet router will be from Cisco. Since router support involves expensive training from the manufacturer, use of more than one brand would not make economic sense.

The Study Group received valuable support and aid in reaching its decisions from many area educational institution's staff members. Without their able and generous support, the process would have been much more difficult.

Representatives for voice, data, and video communications must participate in the design process for all building and renovation projects. Computer Services representatives should participate in project review meetings. The standard approval process for building and renovation plans should satisfy the minimum communications requirements of the Wiring Plan.

The communications plant for a building (wires, closets, conduits, etc.) will be designed jointly by Computer Services and the initial residents of the building. The Wiring Plan specifies the minimum on that design. The infrastructure will be enhanced to meet the specific needs of the occupants. The goal of the wiring plan is to provide an infrastructure that supports the current pervasive communications technologies as well as the emerging technologies that can be reasonably expected to become available in the next five years. In making these recommendations, it is assumed that wire is cheap and that overloading the walls initially is cheaper than retrofitting, allowing new requirements to be met more quickly.

Most of the standards for building wiring have been specified in detail in the technical specifications. This section contains only restatements of the Wiring Plan that emphasize and clarify those specifications.

WIRE

The following minimum bundle will be provided to every outlet:

> TYPE 1 Box (Typical minimum configuration in every office)
> One four-pair 24 gauge, Category 5 unshielded twisted pair (UTP) cable, to be used for telephone.
>
> Three four-pair 24 gauge, Category 5 unshielded twisted pair cables, to be terminated in EIA/TIA 568B Category 5 wired connectors and used for data. The twisted pair wires will be terminated at the outlets in separate RJ-45 female jacks. In the closets, the data cables will terminate on Category 5 UL certified patch panels. The telephone wires will utilize punch blocks.
>
> One pull string.
>
> 1 1/2" conduit (minimum) sufficient for several more wires with 1/2" subduct to allow coax and fiber cabling.

The following specifications are to be used where additional horizontal wiring (optional) is

requested and required by the end-user department:

> One four-pair 24 gauge, Category 5 unshielded or shielded twisted pair cable (potentially suitable for 100 Mbps data transmission.)
>
> 62.5/125 micron multi-mode fiber optic cable (2 fibers), (4 fibers if Dual Attached Station).
>
> 8.3/125 micron single-mode fiber optic cable (2 fibers).

RG6 coaxial cable is not part of the minimum specification. However, a video outlet should be included on the faceplate. It is more cost effective to install this cable at a later date where it is needed than it is to install it automatically to each outlet. There will be more demand for an additional digital network connection. For this reason, a second Category 5 unshielded twisted pair cable for data communications provides more versatility. RG-6 coaxial cable for video applications must continue to be required as part of the minimum installation for locations designated as classroom or conference room space.

Every wire will be labeled at both ends as indicated in the Wiring Plan. Whenever a string is used to pull in a new wire, another pull string must also be pulled.

At the completion of new wiring installations, a listing of cable/outlet numbers with the associated room number will be mounted in each wiring closet. Changes in the wiring outlets, punch blocks, or patch panel connections will be duly noted on these listings.

MANAGEMENT

In order for the Wiring Plan to work, the building wiring system and the closets must be carefully managed. The overall management of the infrastructure should be the responsibility of Computer Services. For now, Computer Services should have responsibility for the entire telephone system, including the telephone instruments, the telephone outlets on the faceplate, the telephone wires, and the telephone equipment in the closets. Telephone equipment in the closet should be physically separated from all other equipment and normally be used exclusively for telephone. Computer Services will also have control over all pieces of the Wiring Plan not explicitly designated for telephone.

Computer Services will specify a division of the plywood and racks in each closet and will specify procedures for installing new equipment, running wires that merely pass through the closet, and for documenting this work. At minimum, these procedures will require all wires to be labeled on both ends; all pieces of equipment labeled as to who is responsible for it; all equipment mounting to be done neatly and in a way that maximizes space for future development; all wiring to be done neatly and compactly, and every change to be documented. Computer Services should also set standards for periodic inspection and cleaning of the closets. Overall, these standards will be flexible enough to permit individual

work groups to accomplish what needs to be done while maintaining the integrity of the Wiring Plan.

The Telephone Company demarc point will be isolated from any other College wiring and each line in use clearly labeled to prevent unwarranted changes by Telephone Company installers.

Computer Services will delegate shared authority for the non-telephone wires and equipment in a building with the residents of that building. This authority may, in turn, be further delegated to the Academic Computing support personnel. With delegated authority comes the responsibility to abide by the rules and standards established by Computer Services. Only those who have been "closet certified" by Computer Services will be allowed to have access to the closets. Computer Services will periodically review compliance with established rules and will have the right to require changes in closet wiring and equipment location or to withdraw authority entirely if the rules are not being followed.

Smooth operation of the College communications facilities will require close cooperation between Computer Services, Academic Computer Services and the various work groups being served.

REVIEW

Each quarter the director of Computer Services will distribute project reports to the Advisory Committee for Communications. Issues to be covered include: projects completed and projects in progress; cost estimates for materials and labor; specific problems encountered; and other factors that affect campus networking. At each monthly meeting of this Committee, Computer Services should be prepared to discuss specifics of these projects, as appropriate, and, in general, address the question of how well the current Wiring Plan is working. They will also present summaries of recent technological developments that affect communications, when these developments occur. The Committee will review this information at least annually and revise the Wiring Plan accordingly.

While the implementation of the Wiring Plan may change every year, the basic goal remains the same: provide an infrastructure that supports the widest variety of communication services possible in a flexible, easy to modify plan that is effective and carefully managed.

IMPLEMENTATION

It is the opinion of the Infrastructure Study Group that these standards should be accepted and this edition of the Wiring Plan implemented immediately. The Wiring Plan should be built into the specifications for all new construction. For work in progress, Computer Services should review each project to determine that the Wiring Plan is being incorporated. For renovations funded by the College, the Wiring Plan should be mandatory.

A. OUTLYING COMMUNICATIONS CLOSETS in all buildings (all but the Main Telecommunications Closet) These areas should be located near the center of each floor and above each other in multiple-storied buildings, to allow for easier routing of vertical conduit and cable systems (see paragraph H). Each closet should be 9' X 10' minimum, and should be large enough to allow free standing, double sided, 19"W x 84"H equipment racks, in whatever number needed, to be mounted in the room. Closets should have a minimum ceiling height of eight (8) feet. Each wiring closet should have a telephone jack.

Environmental controls should be provided. Humidity and temperature monitoring and control equipment should be provided. Ventilation should include air conditioning ductwork and a separate thermostatic control. Extensive room lighting should be installed in a manner which will provide adequate lighting behind equipment racks for safe installation of and service to equipment in the rack units. Emergency lighting should be provided in strategic locations. The walls in this room should be of non-static, dust free enamel. No plumbing, water pipes, sewage or moisture carrying conduits, pipes or vessels should traverse the walls, floors or ceilings of this room. Rooms directly above the computer operations room should not be equipped with laboratory equipment, restrooms, showers, water fountains or other wet room areas. The floor should be constructed to drain water in any portion of the room toward the door where applicable. The floor should be static free. Doors should be one hour fire rated. Where possible, doors should open into corridors. Doors should be equipped with locks, alarm systems and self closing mechanisms. The main entry door should be 36" in width and open into the corridor. Doors should have a glass slot with wire mesh reinforcement and separate keying of all Telecommunication Equipment room doors.

All outside plant cable/conduit and interior building cable/conduit shall hub from this room. Conduit should run above the racks. All splice cases, cable runs, and wiring should be located on the ladders above the racks. All terminations and connections should be mounted on 19", free standing equipment racks. A separate row of racks should be used for each type of media, i.e. fiber optic terminations, telephone cable terminations, and video cable terminations. A minimum of 48" of clearance should be provided behind each row of racks. Racks should be side to side in rows, permanently mounted to the floor, braced to each other with one cable organizer between each pair of racks, and against the adjacent wall. All racks/terminations should be labelled to show the distant end locations.

POWER INSTALLATIONS. Power installations should consist of a dual gang, 30 amp, electrical box, every three feet with 30 amp twist-lock connectors. Boxes should be mounted 3 inches above the floor surface. Each box should be numbered and on a separate 30 amp breaker in a power distribution panel to be mounted in the Telecommunications Equipment room. All power should be encased in metal conduit. Each ground buss should be of solid copper and connected to the building grounding system. A ground buss should be mounted on the wall at a height of 36" on two opposite walls at rack ends and have connections for every room on the floor. The ground buss should be connected to the building electrical ground field.

OPENING FOR CONDUIT. The opening for conduit access into Telecommunications closets should be determined on an individual basis but in no case be less than 10" diameter PVC above ceiling height.

MAIN COMMUNICATIONS CLOSET. The main distribution frame (MDF) closet must meet all specifications for Outlying Telecommunications closets in addition to the following specifications.

A separate rack should be installed for each type of cable termination:

(1) Fiber Optic Cable Distribution Frame. All fiber optic cables should be terminated on a single 19" rack utilizing industry standard fiber optic distribution trays and ST patch panels. External fiber optic cables should be on different patch panels than the interior riser cables. Each termination should be clearly labelled with the distinct end location. All video/rf fiber should be terminated on the 19" rack.

(2) Telephone Cable Distribution Frame. Upon entry into the building on the main floor, the entire OSP twisted pair cable shall be terminated on a standard protector block, equipped with gas filled, modular protectors. It should be extended via a riser cable to the building MDF. The entire twisted pair cable from the White Building MDF should be terminated in the Network Interface Room on a single 19" rack, utilizing 110 type patch panels.

(3) Universal Wiring. The entire building should be wired with Category 5, Unshielded Twisted Pair (UTP) cable, which should be terminated on 19" racks equipped with Category 5, 110 type patch panels. The wiring scheme should utilize four pair station wiring that may be configured for voice or data interface using AMP type plugs in modular connectors. All connections on the 19" racks should be labelled with the distant end location.

B. BUILDING GROUND FIELD. The building should have a main ground field constructed as part of the foundation. A continuous electrical ground appearance should be present in every room for grounding of installed electronic equipment. Each ground should be a Square D part #PKS 2GTA ground bar or equivalent, connected to a #6 gauge copper wire bonded to the external cover of the closest visible electric panel located on the same floor, a solid copper line that is connected to the main ground line for the floor, running back to the IDF main ground buss.

C. OUTSIDE PLANT CONDUIT. No individual conduit run shall exceed 250 feet between pedestals/service points where feasible. All conduit should be run two-way in pairs. Pedestals should be locked to prevent excessive moisture. Conduit from the main building entries to the nearest roadside pedestal should be installed, or a pedestal installed and joined to the nearest conduit run on the campus backbone. Four inch PVC conduits should be installed the entire distance from building entries to the best servicing pedestal. The

necessity for installation of pedestals on either side of street crossings should be determined on an individual basis.

D. OUTSIDE PLANT CABLE. Telecommunications cable should be installed, spliced and terminated to serve the building. It should originate at the building Main Distribution Frame (MDF) and extend through the splice points to the nearest available service cable or extend through the most direct route to the campus MDF at the White Building. Cabling extending the entire distance to the White Building should be appropriately sized for future requirements along the same cable route. Existing conduit may be utilized to extend cables to the campus MDF. Where conduit is insufficient, additional 4" PVC conduit installation should be included in the project. All new conduit should follow the existing conduit routes and connect through existing pedestals or have new pedestals installed if needed. All cables should be professionally spliced, spliced cases should be sealed and re-enterable, cable runs in or through pedestals should be racked and tagged, and all cables should be end to end tested and certified to be free of defects on all pairs. Cables within conduit should be enclosed in flexible innerduct. New conduit should have innerduct pulled and "pull strings" installed. Four inch PVC should be installed for conduit. No less than three 1 1/2 innerducts should be installed in each PVC conduit.

(1) FIBER OPTIC CABLE. Multimode, 62.5/125 micron multi-mode, of not less than 24 strands, with 12 strands 8.3/125 micron single-mode fiber optic cable should be installed, spliced and terminated from the building MDF to the fiber optic MDF at the White Building on 19" racks. All fiber optic cable should be loose buffer, gel-filled, and have a metallic locator conductor. All splices will be of fusion type. Connector terminations should be ST and in accordance with existing College systems design.

(2) VIDEO CABLE. New building construction should include video services that utilize fiber optic delivery from the Education Resources Center (ERC) over single mode cable, to the building MDF. Existing buildings should have video cable installed from the nearest point of coaxial cable entry to the building MDF. Installation of additional equipment, such as amplifiers and power transformers to ensure the quality of video signals should be included in the scope of work. Existing buildings will be brought up to standards when renovated.

(3) TELEPHONE CABLE. New construction or renovations should have a twisted pair, copper, 24 ga telephone cable of not less than 30% more pairs than the projected needs.

E. STATION WIRING. In new construction and renovated buildings, each room, inclusive of all working, storage, and utility spaces, except for janitor closets and restrooms, should be wired in a like manner for voice, video and data services. A flush mounted, modular connector box, similar to an AMP ACO shall be utilized. Rooms having space for more than one occupant, or exceeding more than 120 square feet, should have at least one modular connector box per desk/work space; or one box on each of three, non-entry walls.

Boxes should be mounted fifteen inches above the floor and horizontally centered in the selected wall space. All wiring should be interior to the wall spaces, excluding concrete or masonry walls. Category 5, Universal Wiring should be installed utilizing 4 pair UTP from every station UTP port to the floor IDF, located in the telecommunications closet. A single pull cable group should be pulled from the floor IDF to each station location. Cable groups will be color coded for each type of media conductor within the group and bundled, so as to keep runs in a neat and orderly manner. RG-6 will be utilized to wire each station CATV connector. All power cabling and connectors should be at least 24 inches from any connector box. Numerical designations should be used for connector boxes. Alpha designations should be used for each port on connector boxes and be lettered from left to right, top to bottom. The following box configurations should be utilized to distinguish the type of services to be installed:

TYPE 1. TYPICAL FOR MINIMUM CONFIGURATION IN ALL OFFICES. A Type 1 box should be a four port box, equipped with four, eight wire, data ports (RJ-45). Three ports will be for data; one port will use Category 5 wire (2 pairs) with termination to the telephone end as an RJ11 connection.

TYPE 2. TYPICAL FOR MINIMUM CONFIGURATION IN ALL CLASSROOMS AND CONFERENCE SPACES. A Type 2 box should be a six port box, equipped with one RF video port (RG6 cable, F-61 and RJ-61 female connector typical) and three Category 5, UTP, eight wire ports (RJ-45), one six-wire telephone port (RJ-11) and one unused port. Two Type 2 boxes must be installed in each classroom and each conference space. Placement is one Type 2 box in the front and one type 2 box in the rear of each room.

TYPE 3. A Type 3 box should be a two port box, equipped with two, eight wire, data ports (RJ-45). (Typically used where dual data service is required.)

TYPE 4. A Type 4 box should be a two port box, equipped with one, eight wire (RJ-45) port and one six wire (RJ-11) port. (Could be used in wiring closets.)

TYPE 5. A Type 5 box should be a six port box, equipped with one RF video port, one set of fiber optic (ST multimode fiber optics) connectors, and two UTP ports (RJ-45). (Where high speed data delivery to desk top required with Multimode termination.)

TYPE 6. A Type 6 box should be a six port box, equipped with one RF video port (RG-6), one fiber optic (MIC single mode) connector, and two UTP ports (RJ-45). (Where high speed data delivery to desk top required with Singlemode termination.)

F. STATION CONDUITS. Conduits from each station should be large enough to accommodate the cable group being pulled, but should be no less than 1 1/2" ID (Inside dimension) with 1/2" subduct (to allow pulling RG6 as needed). Station conduits should run

from the horizontal distribution tray in the hallway into the room, extend down the interior of the wall and connect to a flush mounted modular connector box. A separate station conduit should be run for each modular connector box.

G. HORIZONTAL CONDUITS. Horizontal distribution from the telecommunications closet IDF's to the station conduits should be open cable trays mounted above the drop ceilings. Trays should be mounted to the wall, have solid bases and sides, and be mounted eight inches below the top of the reinforced ceiling. Trays should be not less than six inches wide and four inches deep. Power should not utilize the same tray delivery system. Station conduits should be attached to the side of trays. Station cable runs should lay flat in each tray and be as near concentrically run as possible to prevent "spaghetti bowls" at cable crossings.

H. VERTICAL RISER CONDUITS. A vertical conduit system should connect floor telecommunications closets to the Network Interface Room. The conduits should be of rigid steel or PVC and should be 4" inches in diameter. Each telecommunications closet should have at least one dedicated vertical conduit that originates at the Network Interface Room and runs without interruption. Two additional conduits should run vertically from every telecommunications closet to the telecommunications closet on the floors above and below.

I. FIRE PROTECTION. It is recommended that all rooms designated as Computer rooms, or having extensive electronic equipment should have a "dry pipe" pressurized Halon or CO2 (or best available inert gas) fire protection system installed. The system should not be activated until at least two sensors are "tripped"; at which time an audible alarm should sound throughout that floor to warn of impending fire system activation. Activation of the fire protection system should be delayed at least 60 seconds to allow for shutdown of the alarm for "false activations". No fire department alarms should be activated until the system is "charged" and activated. Alarm deactivation switches should be provided in each general area and on each end of the hallway. Alarms should be automatically reset after a two minute delay.

J. UNINTERRUPTED POWER SUPPLY. A maintenance free uninterrupted power supply system of modular construction should be installed for all servers, hubs and routers. American Power Conversion products are recommended. The UPS should be capable of providing continuous power for a period of two hours. The UPS should be a maintenance free, dry cell, type system. Expansion of the system for additional power time should be possible through the stacking of additional modules onto the existing system. The UPS should be mounted in 19" racks or on a rack specifically manufactured for UPS equipment. The APC SmartUPS 2000 or equivalent is recommended due to its notification capability.

K. CLASSROOMS. All classrooms should be wired with Category 5 Universal, 4 Pair, Station Wiring. Where possible, a recessed mounted, covered, six port box with RJ-45 10Base-T connectors should be located every five feet on each wall. The front and back of every classroom should have a recessed mounted, covered, six port box for faculty use.

Each faculty box should be equipped with two UTP RJ-45 connectors, a video port and 1 phone line. A two port connector should be mounted in the front corners of the classroom, near the ceiling. Each should be flush mounted on the wall and contain a video port and a pair of ST fiber optic connectors.

L. CONFERENCE ROOMS. In any new conference rooms, two recessed mounted, covered, six port boxes should be equipped with a two strand ST fiber optic connector, two UTP RJ-45 connectors, and a video port in the front and back of the room. A two port connector should be mounted in the front corners of the room, near the ceiling. Each should be flush mounted on the wall and contain a video port and a pair of ST fiber optic connectors.

M. EMERGENCY LIGHTING. Every hallway should be equipped with emergency lighting battery packs on the walls.

N. ELECTRICAL BREAKERS. In any new construction, each room should have its lights wired to a separate power breaker. Each room should also have its own circuit breaker for its electrical outlets.

O. FLOOR COVERINGS. All floor coverings, carpet and tile, should be of "static free" or "static low" manufacture. Carpets should be of lint free design.

P. TESTING AND CERTIFICATION. All installations should be fully tested for compliance with current cabling standards and those test results submitted in printed format to the Network Manager for analysis. Acceptance of UTP installations should require full compliance with category 5 standards. Video signals should meet current industry standards for residential services. All installations/inspections must be approved/supervised or performed by the Network Manager.

APPENDIX E: INFORMATION AND COMMUNICATION TECHNOLOGY ADVISORY COMMITTEE

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APPENDIX F: PROJECTS AND ESTIMATED COSTS, YEARS THREE THROUGH FIVE

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CAMPUS NETWORK

YEAR 3--CAPITAL OUTLAY, SERVICES, AND SUPPLIES	
Identify a career information package to be installed on the campus network	$600
Replace two (2) Novell servers	$30,000
As White Building is renovated, install conduit with copper to the desktop	$12,000
Install software for inventorying locks and keys	$500
Miscellaneous supplies	$3,500
TOTAL YEAR 3: Capital outlay, services, and supplies	**$46,600**
YEAR 3--TRAINING	
Train 40 faculty/staff in use of the Internet and continue the users' group	$0
Train remaining faculty/staff on use of the campus network	$0
Continue network users' group	$0
Update network training for CS staff	$1,500
TOTAL YEAR 3: Training	**$1,500**
YEAR 3--STAFF POSITIONS	
Continue Network Engineer	$35,000
TOTAL YEAR 3: New or reallocated positions	**$35,000**
YEAR 3--OPERATIONAL COSTS (MAINTENANCE, FEES, ETC.)	
Maintenance of network hardware	$19,027
Maintenance on six Novell servers	$6,000
GroupWise product license and other software licenses	$22,000
Ten (10) telephone lines for dial-in access	$1,700
NCIC annual fee for Internet provider	$2,000
T1 connection to MCNC	$10,247
Maintenance on Internet server and router	$1,800
TOTAL YEAR 3: Operational costs	**$62,774**
YEAR 4--CAPITAL OUTLAY, SERVICES, AND SUPPLIES	
Install conduit and copper wiring to desktops in the Collins and Phillips buildings as they are renovated	$22,000
Replace Internet server to expand access	$36,000
Miscellaneous supplies	$3,500
TOTAL YEAR 4: Capital outlay, services, and supplies	**$61,500**
YEAR 4--TRAINING	
Train faculty and staff in use of the Internet and continue users' group	$0
Update network training for CS staff	$1,500
Train new faculty/staff on access and use of campus network	$0

Continue network users' group	
TOTAL YEAR 4: Training	**$1,500**
YEAR 4--STAFF POSITIONS	
Continue Network Engineer	$35,000
TOTAL YEAR 4: New or reallocated positions	**$35,000**
YEAR 4--OPERATIONAL COSTS (MAINTENANCE, FEES, ETC.)	
Maintenance of six Novell servers	$6,000
Maintenance of network hardware	$14,091
Groupwise product license and other software licenses	$22,000
Ten (10) telephone lines for dial-in access	$1,700
NCIC annual fee for Internet provider	$2,000
T1 connection to MCNC	$10,247
Maintenance on Internet server and router	$1,800
TOTAL YEAR 4: Operational costs	**$57,838**
YEAR 5--CAPITAL OUTLAY, SERVICES, AND SUPPLIES	
Miscellaneous supplies	$3,500
TOTAL YEAR 5: Capital outlay, services, and supplies	**$3,500**
YEAR 5--TRAINING	
Train faculty and staff in use of the Internet and continue users' group	$0
Update network training for CS staff	$1,500
Train new faculty/staff on access and use of campus network	$0
Continue network users' group	$0
TOTAL YEAR 5: Training	**$1,500**
YEAR 5-STAFF POSITIONS	
Continue Network Engineer	$35,000
TOTAL YEAR 5: New or reallocated positions	**$35,000**
YEAR 5--OPERATIONAL COSTS (MAINTENANCE, FEES, ETC.)	
Maintenance of six Novell servers	$6,000
Maintenance of network hardware	$14,091
Groupwise product license and other software licenses	$22,000
Ten (10) telephone lines for dial-in access	$1,700
NCIC annual fee for Internet provider	$2,000
T1 connection to MCNC	$10,247
Maintenance on Internet server and router	$1,800
TOTAL YEAR 5: Operational costs	**$57,838**

INSTRUCTIONAL TECHNOLOGIES

YEAR 3--CAPITAL OUTLAY, SERVICES, AND SUPPLIES	
Purchase one mobile multimedia unit for faculty use in classrooms	$9,000
Develop courses to deliver through distance learning and equip Technology Center	$50,000
Establish and support a CD-ROM network in the ERC	$38,950
Add workstations to ERC	$30,200
Create networked open lab in Technology Center	$70,000
Create Health Technologies lab in Technology Center	$70,000
Replace 75 machines for MST/BCP in Technology Center	$200,000
Add five work stations to drafting lab in Newton	$15,000
Replace 10 PCs in Room 108 at NDC	$25,000
TOTAL YEAR 3: Capital outlay, services, and supplies	**$508,150**
YEAR 3--TRAINING	
Hold a technology fair on campus	$300
Provide multimedia training for five faculty members	$2,500
Establish multimedia mentor program to train faculty and provide release time for faculty mentors (two courses per quarter)	$8,000
Train additional ERC staff on automated library system	$4,500
Train ERC staff on the CD-ROM network	$400
Train two faculty/staff in the technical production and delivery of distance learning	$4,000
TOTAL YEAR 3: Training	**$19,700**
YEAR 3--STAFF POSITIONS	
Continue Computer Technician (half-time)	$8,640
Continue Lab Monitors (78 hrs. per week, 44 weeks)	$24,024
Repair Technician (use existing half-time position for in-house repair shop)	$9,600
Continue Coordinator, Instructional Computing (half-time)	$20,000
TOTAL YEAR 3: New or reallocated staff positions	**$62,264**
YEAR 3--OPERATIONAL COSTS (MAINTENANCE, FEES, ETC.) (Assume all new purchases have one-year warranty.)	
Maintenance on year 1 and 2 purchases--10% of cost	$48,750
Maintenance on automated library system	$1,800
TOTAL YEAR 3: Operational costs	**$49,550**
YEAR 4--CAPITAL OUTLAY, SERVICES, AND SUPPLIES	
Provide one mobile multimedia unit for faculty use in classrooms	$9,000
Develop and offer courses through distance learning	?
Install additional workstations and printers	$29,400
Create a foreign language lab	$99,620
Purchase two computers for Psychology/Sociology and Public Service	$10,000

Replace computers in the following labs:	
Electronics lab 432 Newton with 20 machines	$54,000
64 White with 21 machines	$56,500
Continuing Education lab with 21 machines	$56,500
TOTAL YEAR 4: Capital outlay, services, and supplies	**$315,020**
YEAR 4--TRAINING Hold a technology fair on campus	$300
Provide advanced multimedia training for five faculty members	$2,500
Continue the mentor program to train faculty and provide release time for faculty mentors (two courses per quarter)	$8,000
Train two faculty/staff in the technical production and delivery of distance learning	$4,000
Establish distance learning mentor program to train faculty	$0
Train faculty in use of foreign language lab	$3,500
TOTAL YEAR 4: Training	**$18,300**
YEAR 4--STAFF POSITIONS	
Continue Computer Technician (half-time)	$8,640
Continue Lab Monitors (78 hrs. per week, 44 weeks)	$24,024
Continue Coordinator, Instructional Computing (half-time)	$20,000
Repair Technician (Convert from half-time to full-time)	$19,200
Language Lab Attendants	$15,000
TOTAL YEAR 4: New or reallocated staff positions	**$86,864**
YEAR 4--OPERATIONAL COSTS (MAINTENANCE, FEES, ETC.) (Assume all new purchases have one-year warranty.)	
Line charges for NCIH	$48,000
Maintenance on year 1, 2, and 3 purchases--10% of cost	$94,565
Maintenance on automated library system	$1,800
TOTAL YEAR 4: Operational costs	**$144,365**
YEAR 5--CAPITAL OUTLAY, SERVICES, AND SUPPLIES	
Provide one mobile multimedia unit for faculty use in classrooms	$9,000
Develop and offer courses through distance learning	$0
Replace computers in the following labs:	
BCP/MST lab with 25 new machines (formerly Room 71)	$66,500
111-A at NDC with 21 machines	$56,500
111-B at NDC with 21 machines	$56,500
DeskLab 353 Phillips with 21 machines	$56,500
TOTAL YEAR 5: Capital outlay, services, and supplies	**$245,000**

YEAR 5--TRAINING	
Hold a technology fair on campus	$300
Provide advanced multimedia training for two faculty members	$1,200
Continue the mentor program to train faculty and provide release time for faculty mentors (two courses per quarter)	$6,000
Train two faculty/staff in the technical production and delivery of distance learning	$4,000
Establish distance learning mentor program to train faculty	$0
TOTAL YEAR 5: Training	**$11,500**
YEAR 5--ADDITIONAL STAFF POSITIONS	
Computer Technician (half-time)	$8,640
Lab Monitors (78 hrs. per week, 44 weeks)	$24,024
Continue Coordinator, Instructional Computing (half-time)	$20,000
Repair Technician (Convert from half-time to full-time)	$19,200
Continue Language Lab Attendants	$15,000
TOTAL YEAR 5: Additional staff positions	**$86,864**
YEAR 5--OPERATIONAL COSTS (MAINTENANCE, FEES, ETC.) (Assume all new purchases have one-year warranty.)	
Line charges for NCIH	$48,000
Maintenance on year 1, 2, 3, and 4 purchases--10% of cost	$126,067
Maintenance on automated library system	$1,800
TOTAL YEAR 5: Operational costs	**$175,867**

ADMINISTRATIVE SYSTEMS AND APPLICATIONS

YEAR 3--CAPITAL OUTLAY, SERVICES, AND SUPPLIES	
Provide one microcomputer on main campus to serve as an information station for students to access their grades, etc.	$2,500
Install COMPASS software to analyze ASSET placement test data	$800
Automate grades and attendance reports	?
Purchase 46 PCs for employees	$115,000
Purchase four TDD/TTY for hearing impaired	?
TOTAL YEAR 3: Capital outlay, services, and supplies	**$118,300**
YEAR 3--TRAINING	
Provide computer literacy training for faculty and staff as needed	$0
Continue "super user" program	$0
Continue UNIX training for CS staff as needed	$0
TOTAL YEAR 3: Training	**$0**
YEAR 3--STAFF POSITIONS	
Continue Telephone System Coordinator (reallocate position)	$12,000
Continue UNIX System Administrator/Operator (reallocation of existing positions)	$25,000
Continue Help Desk Technical Support	$14,400
Continue Client-Server Programmer	$25,000
TOTAL YEAR 3: New or reallocated staff positions	**$76,400**
YEAR 3--OPERATIONAL COSTS (MAINTENANCE, FEES, ETC.)	
Maintenance on year 1 and 2 PCs (10% of cost)	$16,700
Lease four phone lines for hearing impaired	$696
ISDN lines NDC and Small Business Center	$1,200
CentraNet--leased telephone services	$99,000
Maintenance on video bulletin board software	$250
Maintenance on UNIX hardware and software	$19,200
Maintenance on telephone registration system	$1,750
TOTAL YEAR 3: Operational costs	**$138,796**
YEAR 4--CAPITAL OUTLAY, SERVICES, AND SUPPLIES	
Provide a microcomputer at NDC to serve as an information station for students	$2,500
Provide a user-friendly interface so that faculty and staff can access read-only information from the second UNIX box	$0
Install imaging hardware and software for archiving student records	$15,000
Upgrade UNIX systems with memory	$18,000
Purchase 50 PCs for employees	$125,000
TOTAL YEAR 4: Capital outlay, services, and supplies	**$160,500**

YEAR 4--TRAINING	
Provide computer literacy training for faculty and staff as needed	$0
Continue "super user" program	$0
Continue UNIX training for CS staff as needed	$0
TOTAL YEAR 4: Training	**$0**
YEAR 4--STAFF POSITIONS	
Continue Telephone System Coordinator (reallocate position)	$12,000
Continue UNIX System Administrator/Operator (reallocation of existing positions)	$25,000
Continue Help Desk Technical Support	$14,400
Continue Client-Server Programmer	$25,000
TOTAL YEAR 4--New or reallocated staff positions	**$76,400**
YEAR 4--OPERATIONAL COSTS (MAINTENANCE, FEES, ETC.)	
Maintenance on year 1, 2, and 3 PCs (10% of cost)	$28,200
Lease four phone lines for hearing impaired	$696
ISDN lines NDC and Small Business Center	$1,200
CentraNet--leased telephone services	$99,000
Maintenance on video bulletin board software	$250
Maintenance on UNIX hardware and software	$19,200
Maintenance on telephone registration system	$1,750
TOTAL YEAR 4: Operational costs	**$150,296**
YEAR 5--CAPITAL OUTLAY, SERVICES, AND SUPPLIES	
Purchase 36 PCs for employees	$90,000
Application development to enhance IIPS software or install new software package to meet the needs of users	?
TOTAL YEAR 5--Capital outlay, services, and supplies	**$90,000**
YEAR 5--TRAINING	
Provide computer literacy training for faculty and staff as needed	$0
Continue "super user" program	$0
Continue UNIX training for CS staff as needed	$0
TOTAL YEAR 5: Training	**$0**
YEAR 5--STAFF POSITIONS	
Continue Telephone System Coordinator (reallocate position)	$12,000
Continue UNIX System Administrator/Operator (reallocation of existing positions)	$25,000
Continue Help Desk Technical Support	$14,400
Continue Client-Server Programmer	$25,000
TOTAL YEAR 5: New or reallocated staff positions	**$76,400**

YEAR 5--OPERATIONAL COSTS (MAINTENANCE, FEES, ETC.)	
Maintenance on year 1, 2, 3, and 4 PCs (10% of cost)	$40,700
Lease four phone lines for hearing impaired	$696
ISDN lines NDC and Small Business Center	$1,200
CentraNet--leased telephone services	$99,000
Maintenance on video bulletin board software	$250
Maintenance on UNIX hardware and software	$19,200
Maintenance on telephone registration system	$1,750
TOTAL YEAR 5: Operational costs	**$162,796**

APPENDIX G: INFORMATION TECHNOLOGY PROJECT TEAMS

Information Technology Project Teams

Instructional Development Committee (standing committee appointed by the vice president/executive dean)

Charge: A multimedia development center has been recommended for implementation in 1995-1996. The committee should study this project and prepare a report which describes in detail the benefits of such a center and justifies the need in light of the projected costs of establishing the center and the annual ongoing operational costs (maintenance, staffing, etc.). If the committee recommends establishing such a center, then the committee must provide specifications of the equipment purchases necessary to support the center; a recommendation concerning facility needs for supporting the center, including projected costs for any renovations; and a recommendation for staffing to support the center, with estimated costs and specifications of existing positions to be reallocated for this function. The Technology Center, scheduled to be occupied in 1997, will have a faculty resource room for use in developing multimedia and other instructional materials; therefore, the facilities recommended will be temporary until this facility is occupied.

Internet

Charge: The team will propose policies and procedures for accessing and using the Internet, including the priorities for use of the Internet, including developing a proposal for a student fee structure to support the Internet access for students. The team will determine the hardware and software requirements to access the Internet as well as to protect the network from security breaches. The report should address staffing requirements.

Members:
Ken Bergman, chair
Richard Godfrey
Mike Kazura
Sheryl Ez
Alan Magid

Video Bulletin Board

Charge: The team will develop policies and procedures related to the video bulletin board, including staff responsibilities for maintaining up-to-date information and for providing technical support. Additional uses of the video bulletin board, such as the closed course monitor system, should be explored. Developing expected outcomes with measurable objectives and an evaluation plan will also be part of this team's responsibilities. Based on the evaluation results, the team will propose enhancing, continuing, or terminating the system.

Members:
Richard Godfrey, chair
Mary Rhoden
Helen Featherson
Chris Jones
Jesse Uzzell

Barcoding Technology

Charge: The team will examine the use of barcoding technology throughout the campus and prepare a feasibility study for expanding this technology as needed. The study will include a cost/benefit analysis, a task analysis (what needs to be done and the time required to complete each task), identification of who will be responsible for implementing, expected outcomes and measurable results, and a proposed evaluation plan.

Members:
Lee Dixon, chair
Anita Ramseur
Ruth Lewis
Janice Gentry

Distance Learning

The Distance Learning Committee will be appointed by the vice president/executive dean. The report for the Computer and Information Technology Planning Committee should compare the costs and benefits of different distance learning technologies (NCIH, wireless, telecourses, courses delivered over the Internet, video cassettes, etc.). Recommendations will include specifications of the equipment and supplies necessary to support distance learning applications; training and staffing required for implementation; ongoing maintenance and operational costs; and a task analysis (what needs to be done and the time required to complete each task).

On-line Registration for Off-Campus Courses and Telephone Registration

The Registration Innovation Subcommittee of the Registration Committee, headed by Pat Jones, Director of Admissions/Registration, will study the feasibility of on-line registration for off-campus courses and telephone registration. The report will include a cost-benefit analysis. Recommendations will specify the equipment and supplies necessary; training and staffing required for implementation; ongoing maintenance and operational costs; a task analysis (what needs to be done and the time required to complete each task); expected outcomes and measurable results; and an evaluation plan.

Library Automation

Charge: The team will prepare a feasibility study, using the Learning Resources Support study group report as the basis. Recommendations will specify the equipment and supplies necessary; training and staffing required for implementation; ongoing maintenance and operational costs; a task analysis (what needs to be done and the time required to complete each task); expected outcomes and measurable results; and an evaluation plan.

Members:
Irene Laube, chair
Bonnie Stone
Mike Kazura
Xelphia Sullivan

Maintenance of PCs and Related Equipment

Charge: This project team will study the maintenance costs associated with implementing the information technology plan and propose ways to control maintenance costs. The study will include a cost-benefit analysis of an in-house maintenance shop, of a shop for building PCs with parts available for repairing existing PCs, of purchasing PCs with 3-year warranties, and of entering into lease agreements. Close monitoring of maintenance costs and projections of future maintenance costs are additional team responsibilities.

Members:
Ken Bergman, chair
Ron Thayer
Ann Faircloth

Groupware and E-Mail Software

Charge: The team will compare different groupware and e-mail systems, determine comptability with the North Carolina Department of Community College's requirements, and recommend software for the campus to adopt as its standard. Team responsibilities include the recommendation of policies and procedures related to campus e-mail.

Members:
Paul Nagy, chair
Charlene West
Mary Winborne
Alma Squires
Marge Newhouse

Managing Instruction

Charge: The team will examine ways to use technology for managing grades, inputting grades, scanning tests, submitting enrollment reports, and preparing tests and course materials. Each project will be studied separately to determine costs and benefits and will include recommendations for software as well as changes in procedures. Recommendations will specify the equipment and supplies necessary; training and staffing required for implementation; ongoing maintenance and operational costs; a task analysis (what needs to be done and the time required to complete each task); expected outcomes and measurable results; and an evaluation plan.

Members:
Coordinator of Instructional Computing, chair
Marsha Cuppitt
Ron Hilbert
Marie Phelps
Beatrice Muhammad